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Pollution Prevention in the Federal Government: Guide for Developing Pollution Prevention Strategies for Executive Order 12856 and Beyond

" . . . federal facilities will set the example for the rest of the country and become the leader in applying pollution prevention to daily operations, purchasing decisions and policies. . . By stopping pollution at its source, the federal government can make a significant contribution to protecting the public health and our environment."
— President Bill Clinton

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Pollution Prevention in the Federal Government

Executive Summary

The federal government plays a crucial role in shaping the direction of environmental action through its multitude of policies and programs. Ultimately it has a major influence on the environmental choices and actions taken daily by people throughout society. Incorporating pollution prevention into the federal government's decision-making processes is a key challenge in addressing the environmental agenda of the 1990s and beyond.

Pollution prevention offers a cost-effective means of meeting environmental objectives in an era in which federal facilities are subject to stricter levels of regulation, greater public scrutiny of their environmental records, and tighter budgetary constraints. Indeed, the costs of failing to prevent pollution in the federal sector have become dramatically evident; in some cases, cleanup costs are estimated in the hundreds of billions of dollars. Pollution prevention is a strategy that meets the needs of the present while laying the groundwork for a cleaner future.

This document sets forth a framework to guide the development of pollution prevention strategies by each agency in the federal government, in the context of several executive orders related to federal environmental responsibilities that were signed by the President in 1993. The new executive orders place federal agencies in a visible and active position in several ways. They require the government to set prevention-related goals — for acquisitions, emission reductions, and solid waste prevention and recycling. They establish timetables for achieving the goals and an intergovernmental structure to promote implementation. Finally, they bring the federal government under the rubric of the environmental

“right-to-know” provisions that have placed the United States at the forefront of environmental progress worldwide.

Armed with a clear sense of direction and specific goals to be achieved, federal agencies will be better able to assume a leadership role in promoting pollution prevention and serve as models for effective environmental action. This document reviews the requirements and possibilities for federal agency action, in each of four roles in which the government can make a significant impact.

1. The government as policy maker and regulator.

Through policies, education, regulations, and enforcement, the federal government can exert a significant influence and motivate change across all sectors of society (e.g., industry, agriculture, energy, transportation, consumers, etc.). Coordination across agencies is a key element in promoting pollution prevention in the federal government. Topics covered in this section of the document include the following:

Agency Strategies: Executive Order 12856 requires federal agencies to develop written pollution prevention strategies by August 1994. Each federal agency strategy must include a pollution prevention policy statement incorporating source reduction in facility management and acquisition programs; outline plans for compliance with the requirements of the executive order; and designate an individual responsible for coordinating pollution prevention efforts.

Facility Plans: Also under Executive Order 12856, federal facilities must develop pollution prevention plans by the end of 1995. Such plans should include a detailed assessment of pollutants generated by the facility, an analysis of pollution prevention opportunities and options, and procedures for implementing and evaluating pollution prevention measures.

Environmental Review: Under the National Environmental Policy Act (NEPA) and section 309 of the Clean Air Act, EPA must review and comment on certain major federal actions. EPA will encourage federal agencies to begin consideration of pollution prevention concepts and approaches as early as possible in the planning process for major actions. EPA and other federal agencies will continue to strive for the inclusion of pollution prevention considerations into all reasonable alternatives analyzed in environmental impact statements and environmental assessments.

Awards and Challenge Programs: To provide encouragement for active agency involvement in pollution prevention, Executive

Order 12856 directs EPA to establish a Federal Government Environmental Challenge Program to recognize and reward outstanding environmental management performance in federal agencies and facilities. Under the program, federal agencies will agree to sign onto a code of environmental principles emphasizing pollution prevention, sustainable development, and "beyond compliance" environmental management programs; individual federal facilities may also submit applications to EPA for recognition as "Model Installations." Executive Order 12873 also authorizes award programs in recognition of innovative environmental programs and model installations.

2. The government as a consumer and purchaser of goods and services.

The U.S. Government is the nation's single largest consumer of goods, products, and services. Through all stages of decision-making in the acquisition process, the government can help create markets for environmentally acceptable products and technologies, and encourage the use of cleaner, less toxic products and materials in other sectors of the economy as well. Federal leadership in demonstrating and purchasing innovative technologies can spur competition, create business and employment opportunities, and enhance local and regional economies.

Products with Toxic Chemicals: Under Executive Order 12856, each federal agency must establish a plan and goals for eliminating or reducing the unnecessary acquisition of products containing extremely hazardous substances or toxic chemicals. The plan should encompass products that the federal agency manufactures, processes, and uses. Each federal agency must also review its specifications and other standardized documents, and identify opportunities to eliminate or reduce the acquisition of extremely hazardous substances or toxic chemicals. The review of these documents must be conducted by August 3, 1995, with appropriate revisions completed by 1999.

Environmentally Preferable and Recycled Products: Executive Order 12873 serves as a signal to federal agencies to buy more products containing recovered materials or considered environmentally preferable. Increasing the demand for these products sets off a positive chain reaction – increasing the demand for recycling programs and reducing the amount of trash to be disposed of, as well as increasing the use of products and services which involve less damage to the environment. Federal agencies must also review and revise specifications and product descriptions and standards to promote the acquisition of environmentally preferable products and products made from recycled or recovered

materials.

Other Products: Other executive orders cover the acquisition of other types of products that have environmental implications. Under Executive Order 12843, federal agencies must begin immediately to minimize the acquisition of the most potent (Class I) ozone-depleting substances and to maximize the use of safe alternatives. Energy efficiency in the workplace will be enhanced by Executive Order 12845, which directs the federal government to purchase only Energy Star computer equipment, which saves energy by automatically entering a low-power, standby state when inactive. Executive Order 12844 commits the federal government to accelerate its existing schedule of purchasing alternative fuel vehicles, with an additional purchase of 11,250 vehicles by FY 1995.

3. The government as a generator of pollution and a manager of facilities.
According to the General Services Administration, there are over 350,000 federal buildings, approximately 27,000 installations on more than 700 million acres of public land. The number of federal facilities of potential environmental concern is enormous. If federal agencies are to become leaders in pollution prevention, their environmental management practices must emphasize pollution prevention through source reduction in the day-to-day business of all federal facilities.

Toxic Chemicals: Under Executive Order 12856, federal facilities that manufacture, process, or use toxic chemicals are now required to publicly report their wastes and releases under the Emergency Planning and Community Right-to-Know Act. The first of the Toxic Release Inventory (TRI) reports are due on or before July 1, 1995, covering the 1994 calendar year. Agencies with facilities that meet the TRI reporting requirements must develop goals to reduce total releases and off-site transfers of TRI toxic chemicals by 50 percent by the end of 1999. Facilities must develop plans to contribute to the agency goal. To the extent practicable, the reductions should be achieved by source reduction practices, in preference to other strategies such as recycling or treatment. Federal agencies that do not meet the reporting threshold for any TRI chemicals are encouraged to set reduction goals for other pollutants that they generate.

Energy and Water Use: Under Executive Order 12902, federal agencies are directed to: (1) reduce overall energy use in federal buildings by 30% by 2005 from 1985 energy use levels; (2) increase overall energy efficiency in industrial

federal facilities by 20% by 2005 using 1990 as the baseline year; (3) minimize use of petroleum products at federal facilities by switching to a less-polluting alternative energy source such as natural gas or solar and other renewable energy sources; (4) designate one major building as a showcase for energy or water efficiency; and (5) purchase products in the upper 25 percent of energy efficency, whenever practicable and cost-effective; and (6) conduct audits and prioritization surveys on all facilities.

Solid Waste Prevention and Recycling: Executive Order 12873 provides a boost to federal agency efforts to prevent the generation of waste at the source and to institute aggressive recycling programs. Each agency must establish a goal for solid waste prevention and a goal for recycling, to be achieved by 1995. An annual report on progress in achieving these goals is required as well.

4. The government as an advocate for technology through research and development and technology transfer. Through policies and programs that conduct and support research and development and technology transfer to prevent pollution, the federal government can affect all sectors of society. By harnessing the capabilities of the federal laboratories, the government can work with industry to accelerate the flow of pollution prevention technologies to the national and international marketplace.

In developing their pollution prevention strategies, federal agencies should be cognizant of the large number of ongoing projects, in such areas as methods development, technology development and evaluation, assessments and demonstrations, technical assistance and technology transfer, and commercialization. Federal agencies should build on these projects rather than duplicating them. Current projects can serve as a framework for cooperative efforts and for developing new applications of pollution prevention methods and technologies. In addition, federal agencies should be aware of the technical and information assistance available from EPA in developing their pollution prevention R&D and technology transfer activities.

Through their many programs, policies, and acquisition decisions, federal agencies are in a strategic position to make pollution prevention the dominant approach to solving environmental issues in our society. Working cooperatively with departments and agencies, EPA hopes to advance pollution prevention at all levels of the government, signaling a new era in federal responsibility and innovation in environmental protection.

I. Overview

Preventing pollution is one of the federal government's top environmental priorities. The new emphasis on pollution prevention has been spurred by the magnitude and seriousness of the environmental risks that remain in the 1990s, the limitations of end-of-pipe pollution controls, and our growing understanding of the complexity of ecological systems.

As President Clinton noted in signing a new executive order for the federal government on pollution prevention:

". . . federal facilities will set the example for the rest of the country and become the leader in applying pollution prevention to daily operations, purchasing decisions and policies. In the process, federal facilities will reduce toxic emissions, which helps avoid cleanup costs and promotes clean technologies."

The federal government's role in promoting pollution prevention is significant. Federal agencies play a crucial role in shaping the direction and focus of our nation's policies and programs. Ultimately the government can have a major influence on the day-to-day choices and actions undertaken by businesses and households. Federal participation is key to changing the central premise of environmental protection from treatment and disposal to pollution prevention.

Pollution prevention offers a cost-effective means of meeting environmental objectives in an era in which federal facilities are subject to stricter levels of regulation and control, to greater public scrutiny of their environmental records, and to tighter budgetary constraints. Indeed, the costs of failing to prevent pollution in the federal sector have become dramatically evident; in some cases, cleanup costs are estimated in the hundreds of billions of dollars. Pollution prevention is a strategy that meets the needs of the present while laying the groundwork for a cleaner, less costly future.

1. Purpose of This Document

This document sets forth a framework to guide the development of pollution prevention strategies by each agency in the federal government. It explains the context of legislation, policy, and federal activity in the pollution prevention area, outlines goals and objectives, and summarizes programs, tools, requirements, and resources that comprise the building blocks for federal action in pollution prevention. Central to such action is the implementation of a number of executive orders signed by the President in 1993 and 1994 that relate to federal environmental

responsibilities. Armed with a clear sense of direction and specific goals to be achieved, federal agencies can assume a leadership role in promoting pollution prevention and in serving as a model for effective environmental action.

The new executive orders place federal agencies in a visible and active position in several ways. They require the government to set prevention-related goals — for acquisition, emission reductions, and solid waste prevention and recycling. They establish a timetable for achieving the goals and an intergovernmental structure to promote implementation. Finally, they bring the federal government under the rubric of the environmental "right-to-know" provisions that have placed the United States at the forefront of environmental progress worldwide. This document is built around the executive orders and illustrates how they form the foundation of pollution prevention in the federal government. These do not, however, constitute all the requirements incumbent on federal agencies; the executive orders and EPA's interpretive guidance documents should be consulted.

The provisions of the executive orders, while ambitious in themselves, should not be taken as the sum total of federal agency action in the pollution prevention field. EPA encourages federal agencies to think broadly about their missions and activities and to find innovative ways to prevent pollution, both in their own activities and in the multiple interactive effects their activities have on other segments of society.

This document also reflects an ongoing process of negotiation and discussion between EPA and other federal agencies over the last several years on pollution prevention topics. In the last few years, EPA negotiated specific pollution prevention agreements and policies with the Department of Energy and the Department of Agriculture. The process of negotiating these agreements helped both EPA and the other agencies determine what types of actions are feasible and what goals can reasonably be attained. Much of that understanding is embodied in the executive orders signed in 1993 and 1994.

Early drafts of this document were reviewed and commented on by other federal agencies. However, in order to make this document available in 1994 — during the time period in which federal agencies are required to develop written strategies of their own — this updated document has not been subject to formal approval or adoption by federal agencies other than EPA. Also in the interests of time and accuracy, most of the programs, resources, and tools listed in this document are limited to EPA activities, despite the growing number of publications, tools, and initiatives being developed elsewhere in the federal government and the private sector.

This overview sets the stage by setting forth goals and objectives for the federal role in pollution prevention. It provides a workable definition of pollution prevention and describes the major programs that serve as models or frameworks for federal pollution prevention initiatives.

2. Goals and Objectives

Pollution prevention must become a part of the environmental ethic at every level of the federal government. Government personnel should build environmental considerations into their daily decision-making processes, programs, and policies, in much the same way that economics has become a fundamental and integral component of all government planning and decision models. As prevention becomes more widely understood and implemented, it will be advocated not only for its environmental benefits but also for its economic benefits.

The following is an overall goal statement that embodies this vision:

Goal: To establish the federal government as the national leader in implementing pollution prevention policies and practices across all missions, activities and functions in order to promote the sustainable use of natural resources and protect the environment and human health.

The federal government has an enormous potential to promote pollution prevention. There are four primary roles in which the government can make a significant impact:

1.

The government as policy maker and regulator. Through policies, education, technical assistance, regulations, incentives, and enforcement, the federal government can exert a significant influence on environmental activities, and motivate change across all sectors of society (e.g., industry, agriculture, energy, transportation, consumers, etc.).

Objective: To ensure that all programs, policies and regulations of federal agencies incorporate pollution prevention concepts and approaches; and to provide appropriate incentives for the private sector to undertake such practices.

2.

The government as a consumer and purchaser of goods and services. The U.S. Government is the nation’s single largest consumer of goods and services. Procurement by the

Department of Defense alone account for 2 to 3 percent of total GNP.

Objective: To implement affirmative environmental acquisition programs and life-cycle costing practices throughout the federal government in order to prevent pollution, reduce waste, reduce impacts on natural resources, and create markets for environmentally preferable products and technologies.

3.

The government as a generator of pollution and a manager of facilities. According to the General Services Administration (GSA), there are over 350,000 federal buildings, approximately 27,000 installations on more than 700 million acres of public land. The number of federal facilities of potential environmental concern is enormous. Environmental cleanup of 24,000 contaminated sites on federal facilities in the U.S. may cost between $100 and $400 billion, and will extend well into the next century. (Interim Report of the Federal Facilities Environmental Restoration Dialogue Committee, U.S. EPA and The Keystone Center, February 1993.)

Objective: To significantly reduce the quantity and toxicity of pollutants released and wastes generated by federal facilities and on public lands and to make pollution prevention the approach of first choice in all environmental management decisions.

4.

The government as an advocate for technology through research and development and technology transfer. Through policies and programs that support research and development and technology transfer, the federal government can promote pollution prevention across all sectors of society. By harnessing the capabilities of the federal laboratories, the government can work with industry to accelerate the flow of pollution prevention technologies to the national and international marketplace.

Objective: To develop technical solutions and foster technology transfer among federal agencies and between the public and private sectors with the aim of addressing pollution prevention needs and enhancing United States competitiveness in markets for goods and services that are environmentally preferable.

Each of these objectives is discussed in a separate chapter in the rest of this document.

3. Defining Pollution Prevention

Under Executive Order 12856, pollution prevention means "source reduction," as that is defined in the Pollution Prevention Act of 1990, as well as other practices that reduce or eliminate the creation of pollutants through:

- increased efficiency in the use of raw materials, energy, water, or other resources, or
- protection of natural resources by conservation.

The Pollution Prevention Act (Section 6603) defines "source reduction" to mean any practice that:

- Reduces the amount of any hazardous substance, pollutant or contaminant entering any waste stream or otherwise released into the environment (including fugitive emissions) prior to recycling, treatment, or disposal; and
- Reduces the hazards to public health and the environment associated with the release of such substances, pollutants or contaminants.

The term includes: equipment or technology modifications, process or procedure modifications, reformulation or redesign of products, substitution of raw materials, and improvements in housekeeping, maintenance, training, or inventory control.

Under the Pollution Prevention Act, recycling, energy recovery, treatment, and disposal are not included within the definition of pollution prevention. However, some practices commonly described as "in-process recycling" may qualify as pollution prevention. Examples might include solvent recycling or volatile organic recovery. Recycling that is conducted in an environmentally sound manner shares many of the advantages of prevention — it can reduce the need for treatment or disposal, and conserve energy and natural resources.

The Pollution Prevention Act established a new environmental management hierarchy as national policy. This hierarchy, also incorporated in Executive Order 12856, calls for the following:

- Pollution should be *prevented or reduced at the source* whenever feasible;
- Pollution that cannot be prevented should be *recycled in an environmentally safe manner* whenever feasible;
- Pollution that cannot be prevented or recycled should be *treated in an environmentally safe manner* whenever feasible; and
- *Disposal or other release* into the environment should be employed *only as a last resort* and should be conducted in an environmentally safe manner.

Pollution prevention approaches can be applied to

pollution-generating activity across virtually all sectors of society, including energy, agriculture, the consumer sector, and the federal government.

As the Preamble to Executive Order 12856 states: “the environmental, energy, and economic benefits of energy and water use reductions are very significant; the scope of innovative pollution prevention programs must be broad to adequately address the highest-risk environmental problems and to take full advantage of technological opportunities in sectors other than industrial manufacturing.”

In the energy sector, pollution prevention can reduce environmental damages from extraction, processing, transport and combustion of fuels by increasing efficiency in energy use; substituting environmentally benign fuel sources; and design changes that reduce the demand for energy.

In the agricultural sector, preventive practices may include natural resource protection efforts such as reducing the use of water and chemical inputs; adoption of less environmentally harmful pesticides or cultivation of crop strains with natural resistance to pests; and changes in management practices to prevent harm to sensitive ecosystems. The impairment of wetlands, ground water sources, and other critical resources constitutes pollution; preventive practices are essential for preserving the environmental benefits of these natural resources.

4. New Executive Orders Relating to Pollution Prevention

Over the last five years, pollution prevention has become the preferred environmental strategy and a central focus for environmental efforts in the Congress, at EPA, and elsewhere. Exhibit 1 on these pages provides an annotated list of major pollution prevention milestones in policies, legislation, and regulations. This section reviews six executive orders related to pollution prevention and waste prevention that were signed in 1993 and 1994. These orders (included as appendices to this document) form a framework for pollution prevention activities by federal (executive) agencies in the next decade.

4.1 Executive Order 12856: Pollution Prevention & Right-to-Know

One of the most important milestones in federal pollution prevention activities was the signing of Executive Order 12856 (“Federal Compliance with Right-to-Know Laws and Pollution Prevention Requirements”) in August 1993. This order is expected to serve as a central directive to federal agencies on pollution prevention over the coming years. Exhibit 2 (see page 9) presents a timeline of its major requirements. The full executive order is included as Appendix B to this document. Executive Order 12856 requires

federal agencies to develop written pollution prevention strategies and facility-specific plans, and to set goals for eliminating the acquisition, manufacturing, processing, or use of toxic chemicals and extremely hazardous substances.

Under Executive Order 12856, federal agencies must comply with the planning and reporting provisions of the Emergency Planning and Community Right-to-Know Act (EPCRA) and the Pollution Prevention Act. Section 313 of the Emergency Planning and Community Right-to-Know Act established the Toxic Release Inventory (TRI) and requires certain manufacturers to report annually to EPA on whether they manufacture, process, or otherwise use any of over 300 toxic chemicals, and if so, the amounts of the chemicals involved. Under Executive Order 12856, the TRI reporting framework will now be extended to federal facilities (see Chapter 4 for a full discussion).

In a short period of time, TRI has become one of the most powerful tools in this country for tracking pollution prevention progress among industrial sources. Unlike other data bases, TRI permits the tracking of chemical releases at specific facilities on a multi-media basis. Beginning with data submitted in 1992, TRI reports also contain detailed source reduction and recycling information as mandated by the Pollution Prevention Act. TRI is already being used widely by industry, the states, and environmental groups as a scorecard for prevention efforts. Many companies have already undertaken substantial voluntary public commitments to reduce the release of TRI chemicals.

Executive Order 12856 calls on federal agencies to develop a 50 percent reduction goal by 1999 for their releases of toxic chemicals, or pollutants, with the baseline being no later than 1994.

4.2 Executive Order 12873: Acquisition, Recycling, and Waste Prevention

Executive Order 12873 (“Federal Acquisition, Recycling, and Waste Prevention”), signed in October 1993, directs federal agencies to implement acquisition programs aimed at encouraging new technologies and building markets for environmentally preferable and recycled products. Toward this end, all agencies are directed to review and revise their specifications, product descriptions, and standards. Agencies also must set goals for waste prevention and the acquisition of recycled products, and report on their progress in meeting the goals. EPA is directed to issue guidance on environmentally preferable products and to institute a new process for designating products with recycled content. The order requires high-level environmental executive positions and staffing in federal agencies to ensure implementation of the directives,

establishes model facility and recycling programs, and contains specific requirements related to recycled paper.

4.3 Executive Order 12902:Energy Efficiency and Water Conservation

Under Executive Order 12902 (“Energy Efficiency and Water Conservation at Federal Facilities”), federal agency use of energy and water resources is directed towards the goals of increased conservation and efficiency. Each agency must undertake a prioritization survey of all its facilities leading to a 10-year plan to conduct comprehensive energy and water audits.

Under the executive order, federal agencies must develop and implement programs aimed at: (1) reducing overall energy use in federal buildings by 30 percent by 2005; (2) increasing overall energy efficiency in industrial federal facilities by 20 percent by 2005; (3) significantly increasing the use of solar and other renewable energy sources; and (4) minimizing use of petroleum products at federal facilities by switching to less-polluting alternative energy sources.

4.4 Executive Orders 12843, 12844, 12845: Ozone-Depleters,Alternative Fueled Vehicles, Energy Star Computers

Three other executive orders, signed on Earth Day 1993, commit the federal government to accelerated action on several fronts — phasing out ozone-depleting substances, purchasing alternative fueled vehicles, and buying energy-efficient computers.

Executive Order 12843 (“Procurement Requirements and Policies for Federal Agencies for Ozone-Depleting Substances”) directs federal agencies to change their procurement policies to reduce the use of ozone-depleting substances earlier than the 1995 phase-out deadline called for in the Montreal Protocol. Federal agencies are directed to modify specifications and contracts that require the use of ozone-depleting substances and to substitute non-ozone-depleting substances to the extent economically practicable. Through affirmative acquisition practices, the federal government will provide leadership in the phase-out of these substances on a worldwide basis, while contributing positively to the economic competitiveness on the world market of U.S. manufacturers of innovative safe alternatives.

Executive Order 12844 (“Federal Use of Alternative Fueled Vehicles”) places the federal government in the leadership of the use of alternative fueled vehicles, calling on each agency to adopt aggressive plans to exceed the purchase requirements of such vehicles established by the Energy

Policy Act of 1992.

The use of alternative fueled motor vehicles can reduce air pollution, stimulate domestic economic activity, reduce vehicle maintenance costs, and provide market incentives for the development of such vehicles and the fueling infrastructure needed to support large numbers of privately owned alternative fueled vehicles.

Finally, under Executive Order 12845 ("Requiring Agencies to Purchase Energy Efficient Computer Equipment"), the U.S. government became a participant in the Energy Star Computer program by agreeing to buy energy-efficient computers, monitors, and printers to the maximum extent possible. To the extent possible, federal agencies must now purchase only those computer products that qualify for the Energy Star logo, as long as they meet other performance requirements and are available in a competitive bid.

A matrix of requirements across the six executive orders is shown in Exhibit 3.

Exhibit 1
Chronology of Pollution Prevention Policies, Legislation, Regulation

September 1990 Science Advisory Board report calls for pollution prevention

In this influential report, *Reducing Risk: Setting Priorities and Strategies for Environmental Protection* (Washington, D.C., September, 1990), EPA's Science Advisory Board stated as a major recommendation that "EPA should emphasize pollution prevention as the preferred option for reducing risk." The report further points out that "some pollution prevention techniques ... can pay for themselves quite apart from environmental considerations. One reason that Japan and Western Europe are formidable economic competitors is that they use energy and raw materials so efficiently."

November 1990 Pollution Prevention Act of 1990 enacted

Congress affirmed its commitment to a new approach to improving environmental quality by passing this legislation. Congress recognized the important leadership role that federal agencies must play in the pollution prevention arena. In the Act, Congress directed EPA to:

(1) "Promote source reduction practices in other federal agencies" and,

(2) "Identify opportunities to use federal procurement to encourage source reduction."

January 1991 EPA issues National Pollution Prevention Strategy

The National Pollution Prevention Strategy (*Federal Register* 56:7849-64, February 26, 1991) outlines EPA's pollution prevention policy. EPA's National Strategy also commits the Agency to develop similar strategies for other sectors of the economy, including agriculture, energy and transportation, the consumer sector, and the federal government.

A major initiative announced in 1991 as part of EPA's National Pollution Prevention Strategy was the 33/50 Program, which seeks voluntary reductions by industry in the release and off-site transfer of 17 high priority chemicals. The goal was to reduce releases of these 17 chemicals in the aggregate, from 1.4 billion pounds in 1988 to 700 million pounds in 1995 — a 50 percent reduction. An interim goal was to achieve a 33 percent reduction by the end of 1992; that interim goal was actually achieved by 1991. To date, over 1000 companies have committed to an average reduction of 50 percent by 1995, for an overall reduction commitment of over 315 million pounds.

April 1991 Executive Order 12759 ("Federal Energy Management") signed

This order directs all federal agencies, among other things, to reduce their energy use and increase energy efficiency by at least 20 percent by the year 2000 in federal buildings and facilities, from 1985 levels.

October 1991 Executive Order 12780 ("Federal Recycling and Procurement Policy") signed

This order was designed to promote a greater role in waste reduction and recycling on the part of all federal agencies and to set up a special council that will monitor and report on agency performance. The order notes that the federal government is one of the nation's largest generators of solid waste and calls on the government to become a visible and active leader in addressing the solid waste dilemma through its own acquisition policies. Under the Executive Order, each federal agency must initiate a waste reduction and recycling program, and designate an Agency Recycling Coordinator responsible for coordinating agency activities on waste reduction and recycling and for reporting the information to EPA. The order also establishes a Council on Federal Recycling and Procurement Policy to encourage active participation in waste reduction, recycling, and procurement programs, recommend changes in federal agency specifications and standards to enhance aquisition of recycled products, and showcase effective programs being developed. This order was rescinded with the

signing of E.O. 12873 by President Clinton on October 20, 1993.

April 1992 EPA and the U.S. Department of Agriculture (USDA) signed a Memorandum of Agreement to implement increased pollution prevention

The Memorandum of Agreement (MOA) puts in place a plan to address agriculturally related environmental problems and to implement increased pollution prevention in the agricultural sector. The Agreement outlines four basic strategies to achieve environmental results: (1) implementation of a nationwide pollution prevention program to minimize agriculturally-related pollution and environmental risks; (2) establishment of a coordinated research, technology development, and technology transfer system that supports production practices that protect and enhance the environment; (3) implementation of a comprehensive marketing strategy to promote voluntary pollution prevention; and (4) strengthening of the working relationship between EPA and USDA in order to provide a unified force for positive change in the area of agricultural pollution prevention.

September 1992 Policy Directive issued by the Secretary of Energy

Reflecting an agreement reached between EPA and the Department of Energy, the directive commits DOE to participate in the 33/50 program and initiate full voluntary Toxics Release Inventory (TRI) reporting for all DOE facilities. DOE agreed to strive to achieve, by the end of 1995, a 50 percent reduction in releases of 17 priority chemicals from facilities that are currently required to submit TRI reports; all other DOE facilities would initiate voluntary TRI reporting beginning in 1993, with a 33 percent reduction goal for the 17 chemicals by the end of 1997. (Similar to the industrial 33/50 program, the first goal is set for five years after TRI reporting begins.) DOE also agreed to initiate a review of its specifications and standards, beginning with reductions in the use of the 17 priority chemicals in the 33/50 program. As part of the agreement, EPA agreed to provide DOE with technical assistance.

October 1992 Energy Policy Act of 1992 enacted

The law gives a major boost to energy efficiency and renewable energy. It includes provisions on alternative fuels, electricity, global warming research, and more. To encourage energy efficiency, the law uses a mixture of voluntary and mandatory measures, requiring new efficiency standards for appliances that use energy and

water. The law promotes the use of alternative fuels, requiring certain federal, state, and private fleets of cars to increase their numbers of alternative-fueled vehicles. Tax credits and federal loan support are provided for renewable energy projects; a variety of research programs are authorized as well. The Act also gives wholesale power producers greater, more affordable access to transmission lines and transmission services.

April 1993 Three Executive Orders signed; two others announced

In the President's Earth Day speech, three executive orders were signed, covering the early phaseout of ozone-depleting chemicals (12843), accelerated federal purchases of alternative fueled vehicles (12844), and federal participation in the Energy Star Computer program, requiring the purchase of energy-efficient computers and computer equipment (12845). Two other executive orders were announced, covering pollution prevention in the federal government (12856) and recycled goods (12873) (see below). Other environmental programs initiatives were announced as well, including the National Biological Survey and signing of the Biodiversity Convention.

August 1993 Executive Order 12856 ("Federal Compliance with Right-to-Know Laws and Pollution Prevention Requirements") signed August 3, 1993

This order requires federal agencies to comply with planning and reporting provisions of the Emergency Planning and Community Right-to-Know Act and the Pollution Prevention Act, to develop a written pollution prevention strategy, and to set goals for eliminating the acquisition, generation, or use of toxic chemicals.

October 1993 Executive Order 12873 ("Federal Acquisition, Recycling and Waste Prevention") signed October 20, 1993

This order directs federal agencies to set goals for solid waste prevention and recycling to be achieved by 1995 and to implement affirmative acquisition programs for all designated EPA guideline items purchased. EPA must issue guidance on environmentally preferable products and expedite the process of designating products with recycled content. The Order establishes high-level environmental executive positions and staffing to ensure implementation of the directives, establishes model facility and recycling programs, and sets minimum recycled content standards for printing and writing paper.

March 1994 Executive Order 12902 ("Energy Efficiency and Water Conservation at Federal Facilities") signed March 8,

1994
This order requires agencies to set goals of reducing energy consumption, increasing energy efficiency, auditing their facilities for energy and water use, purchasing energy-efficient products, increasing the use of solar and other renewable energy sources, designating a "showcase" facility, and minimizing use of petroleum-based fuel.

Exhibit 2
Deadlines for Implementation
of Executive Order 12856

Dec. 31, 1993
Agencies provide planning list to EPA of facilities covered by the Executive Order
Jan. 1994 Facilities submit Emergency Notification of Releases of an Extremely Hazardous Substance under section 304 of EPCRA
Mar. 3, 1994
Facilities submit Emergency Planning Notification to Local Emergency Planning Committee (LEPC) under section 302 of EPCRA
Aug. 3, 1994
Agencies submit pollution prevention strategies to EPA
Aug. 3, 1994
Facilities submit information for the preparation of Comprehensive Emergency Response Plans under section 303 of EPCRA
Mar. 1, 1995
Facilities submit Emergency and Hazardous Chemical Inventory Form under section 312 of EPCRA
July 1, 1995
Facilities submit TRI reports under section 313 of EPCRA
Aug. 3, 1995
DoD and GSA identify opportunities to revise specifications and standards
Oct. 1, 1995
Agencies submit first annual progress report
Dec. 31, 1995
Facilities prepare Pollution Prevention Plans
1999 DoD and GSA revise specifications and standards
1999 Agencies reduce total toxic chemicals or toxic pollutants by 50 percent

Exhibit 3
Cross Reference of Requirements of Recent Environmental Executive Orders

	EO 12856	EO 12873	EO 12902	EO 12843	EO 12844	EO 12845
	August 3, 1993	October 20, 1993	March 8, 1994	April 21, 1993	April 21, 1993	April 21, 1993
Common Requirements	Right-to-Know & Pollution Prevention	Acquisition, Substances	Energy Efficiency & Fuel Vehicles	Ozone Depletion Computers	Recycling & Waste Prevention	Alternative & Water Conservation	Energy Efficient
Review and Revise Documents	Section 401, 501, 1(b)	Section 507(d)	Sections 4(a) & (b) (Specs, STDs, etc.)	Section 505, 506	Sections 3-303(b)		
FAR Changes		Sect. 3-303(c) Section 8		Section 903			
Contract Language	Section 3 & 4(c)	Section	Section 1-104 1(b)	Sections 701	306(c)		
Life Cycle Concepts	Section 2(c)	Section	Section 4-404	Sections 401	306, 309		
Acquisition/ Procurement Policy	Section 1	Sections 401-404, 502-504, 701-702	Sections 2 3-303(a)	Section 501(d), 507	Section 1, 3, & 4	Section 3-301,	
Goals	Sections 3-302, 3-303(a) 1 & 2		Section 601, 602	303		Sections`	
Annual Reporting	Sections 308	Sections (One Time)	Section 4-402, 5-507	Section 5 6	Section 301, 501, 1(d)		
Awards	Section 504	Sections	Section 4-405	801, 802			

II. Strategies for Prevention

The Government's Role in Setting Policies and Regulations

Objective: "To ensure that all programs, policies and regulations of federal agencies incorporate pollution prevention concepts and approaches; and provide appropriate incentives for the private sector to undertake such practices."

1. Introduction

Federal programs, policies, and regulations help define

not only the actions of federal agencies but a wider circle of economic and environmental behavior. Government policies can have wide ramifications throughout this nation and the rest of the world. The goal is to place the federal government in the forefront of the pollution prevention effort, both in its own internal policies and procedures and in its interactions with others. Toward that end, each affected federal agency should examine its policies, regulations, and programs to identify and address any obstacles to pollution prevention and to provide incentives for overcoming such barriers.

This chapter outlines the responsibilities of federal agencies to develop pollution prevention strategies and facility pollution prevention plans — specific requirements of Executive Order 12856. It also discusses coordinating mechanisms across federal agencies, award and challenge programs, and EPA's environmental review responsibilities under the National Environmental Policy Act (NEPA) and the Clean Air Act. The chapter concludes with a summary of EPA's own efforts to incorporate pollution prevention into the Agency's policy and regulatory mission.

2. Agency Pollution Prevention Strategies

This document is intended to assist agencies by providing a framework to follow in developing agency pollution prevention strategies required by Executive Order 12856. Under the Executive Order, federal agencies must develop written pollution prevention strategies by August 1994.

2.1 Strategy Components

Each federal agency strategy should:

- Include a pollution prevention policy statement incorporating source reduction in facility management and acquisition programs, endorsing the environmental protection hierarchy, and calling for agency leadership in pollution prevention.
- Make a written "commitment to utilize pollution prevention through source reduction, where practicable, as the primary means of achieving and maintaining compliance with all applicable Federal, State and local environmental requirements."
- Set forth the agency's voluntary goals to reduce releases and transfers of EPCRA section 313 toxic chemicals, or to reduce toxic pollutants, and a timetable for reaching these goals by 1999.
-

Explain the baseline (no later than 1994) for measuring reductions in toxic chemicals or pollutants.

- Outline plans for compliance with the requirements of the executive order, including reporting requirements, toxics reductions, review of specifications and other standardized documents, and changes in acquisition procedures.
- Outline plans for disseminating pollution prevention techniques and approaches internally through training, and externally in making pollution prevention reports, strategies, and plans available to the public.
- Designate a senior agency manager/policymaker responsible for coordinating pollution prevention efforts agency-wide and overseeing agency compliance with the executive order.
- Designate internal organizations with specific responsibilities for developing the strategy, implementing it, and evaluating its effectiveness.
- Include provisions for public involvement in implementation of the executive order and maintaining public awareness of agency progress in meeting the requirements of the executive order.

The executive order expressly encourages federal agencies to involve the public in developing pollution prevention strategies. Because public involvement and community awareness are basic tenets of the executive order, agencies should strive for public participation during preparation of strategy documents and inform the public of progress in meeting the goals of those strategies and the executive order.

Section 3-301 of Executive Order 12856 states that each agency must commit in its strategy to using pollution prevention/source reduction as the primary means to achieve and maintain compliance with all federal, state, and local environmental requirements. That is, pollution prevention must be the method of first choice in (1) achieving compliance with new regulations and requirements; (2) maintaining compliance with existing regulations and requirements; and (3) returning to compliance when violations are identified. Federal agencies are encouraged to use pollution prevention to go beyond compliance toward zero discharge/emissions of pollutants.

Making this critical linkage between pollution prevention and compliance holds the key to sustainable, environmental management programs, at both federal and private sector facilities. Whether it is a new regulatory requirement under the Clean Air Act, an ongoing RCRA compliance problem

identified through an internal audit at a facility, or a violation which must be corrected as a result of an EPA or state enforcement action, the key is to first explore whether or not there is a pollution prevention solution to the environmental problem. This is often the best way to comply with environmental requirements and the best thing for the environment as well.

Over the last few years, pollution prevention policies have been adopted to varying degrees by different federal agencies. The Department of Defense (DOD) and Department of Energy (DOE) have been among the most active in developing waste minimization and pollution prevention programs and policies. Most recently, in December 1993, DOD issued a policy statement renewing its support for pollution prevention and rapid implementation of Executive Order 12856 (a copy of the DOD policy statement is included in this document in Appendix F). Other federal agencies, such as the U.S. Postal Service, have also adopted environmental protection policies that include elements of pollution prevention, source reduction, and sustainability (see box above).

EPA will continue to work closely with DOD, DOE and other federal agencies on incorporating pollution prevention into their policies, guidelines, and directives. EPA is ready to assist federal agencies in developing or enhancing their pollution prevention policies and strategies. Information useful to federal agencies in designing a pollution prevention program is available on the PIES computer database (see box on page 24).

Executive Order 12856 requires federal agencies to submit annual progress reports to EPA beginning on October 1, 1995. These reports should include the status of the agency's strategy and facility plans, progress toward the 50 percent reduction goal and acquisition goals, progress in reviewing and revising specifications and standardized documents, a sampling of new and innovative pollution prevention technologies fostered, and TRI chemical releases reported for the previous year.

2.2 Adopting an Environmental Ethic

In designing and implementing their pollution prevention strategies, federal agencies must develop and share a common ethic on environmental protection. Achieving what is sometimes called "Green Government" requires that an environmental ethic be adopted by the heads of federal departments and conveyed to their managers and staffs. Specifically, this ethic should ensure that:

- Sufficient policy direction is given to ensure that environmental protection is an explicit component of the

organization’s overall mission.

- Adequately qualified and trained staff are available in sufficient numbers to fully identify, scope, and resolve problems related to federal environmental liabilities.
- Proactive environmental programs are developed that establish environmental compliance as the floor rather than the ceiling of environmental performance, and that actively promote pollution prevention as an opportunity for improvement rather than as simply another bureaucratic requirement.
- Employee initiative is fostered to actively incorporate environmental protection into the daily tasks of the agency.

To demonstrate their commitment to this ethic, federal agencies and departments should ensure that an environmental policy “infrastructure” is in place, including the following components:

- Written policies defining the standards and procedures to be followed by the agency’s employees;
- The assignment of specific high-level persons who have the authority to ensure compliance with environmental standards and procedures;
- Effective communication of standards and procedures to agency employees and contractors (e.g., participation in training programs and dissemination of publications);
- An effective and consistent program for enforcing agency standards (e.g., environmental auditing programs, annual reports on agency liabilities and compliance, compliance tracking systems) designed to detect and prevent noncompliance and environmental impairment and/or third party exposure and loss;
- A well-publicized system, under which agency employees or contractors are encouraged to report, without fear of retaliation, evidence of environmental problems or criminal conduct within the agency;
- The infusion of departmental or agency environmental policies and standards into the annual performance criteria of federal employees who manage federal facilities or in any way have environmental responsibilities;
- A well-designed management communication system with

designated contacts in the agency's Office of General Counsel, Office of the Secretary or Administrator, and the environmental management office that facilitates prompt and expedited responses by the agency to discoveries of contamination, releases of hazardous waste and materials, and violations of environmental regulations and statutes; and

- Demonstration of the agency's interest in achieving environmental goals beyond compliance, by establishing pollution prevention programs and employee awards for achieving and maintaining sound environmental programs.

EPA plans to recognize federal agencies and facilities which establish and implement effective environmental management programs through the Federal Government Environmental Challenge Program required by Executive Order 12856. This is discussed under section 4 of this chapter in more detail.

2.3 Environmental Justice

In developing agency pollution prevention strategies and facility-specific pollution prevention plans (and when implementing other requirements of Executive Order 12856), agencies should consider and plan for the following requirement of Section 3-302(c) of Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations:"

"Each Federal agency, whenever practicable and appropriate, shall collect, maintain and analyze information on the race, national origin, income level, and other readily accessible and appropriate information for areas surrounding Federal facilities that are (1) subject to the reporting requirements under the Emergency Planning and Community Right-to-Know Act, 42 U.S.C. section 11001-11050 as mandated in Executive Order 12856; and (2) expected to have a substantial environmental, human health, or economic effect on surrounding populations. Such information shall be made available to the public, unless prohibited by law."

In order to avoid duplicative efforts, agencies are encouraged to consult and coordinate in complying with this provision.

3. Facility Pollution Prevention Plans

Executive Order 12856 requires each "covered facility" to develop a written pollution prevention plan by the end of 1995. The facility pollution prevention plan outlines facility-wide methods to reduce pollutants and reach the required reduction goals. Essentially, the plan offers an

environmental blueprint for reducing waste generation, reducing worker exposure to hazardous materials, protecting natural resources, and minimizing environmental impacts caused by facility operations. EPA is currently developing a "Federal Facility Pollution Prevention Planning Guide," which is planned for issuance in mid-1994.

Depending on the size of the facility, suggested components of a pollution prevention program include the following:

- **Set facility policy and goals.** Goals and policies for the facility's pollution prevention achievements should be clearly laid out. Facilities may want to include a definition of the facility's "primary mission" that assists managers and staff in understanding the scope and priority of pollution prevention activities. As an example, if a particular facility is devoted to aircraft painting and cleaning, those activities should form the highest priority for a pollution prevention assessment. Other activities that are tangentially related to the facility's mission should not be overlooked, but generally should be given attention after primary mission activities have been examined.

- **Management commitment to pollution prevention.** Management commitment should be demonstrated through upper-level, written commitment to policies and actions to support pollution prevention, including: naming a Pollution Prevention Coordinator and outlining his or her responsibilities; establishing a Pollution Prevention Task Force with adequate representation by staff from all key divisions of the facility; committing adequate levels of staff, resources, and funding; equipment purchases; training and incentive programs; and ongoing communications procedures. The facility plan should discuss progress in each of these areas and plans for the future.

- **Baseline study.** This study should provide systematic baseline information on pollutant generation, environmental releases of pollutants, worker exposures to hazardous chemicals, use and management of hazardous materials, and adverse environmental impacts. The facility plan should summarize the information developed.

- **Identification of opportunities and options.** Based on the results of the baseline study, brainstorming sessions should be held among staff and managers to systematically identify opportunities and options for instituting pollution prevention measures. The plan should summarize the results of these efforts.

- **Ranking of options.** Criteria should be developed for prioritizing the opportunities identified and for ranking the options developed. Typical criteria include costs (life-cycle costs should be considered wherever possible), liability, regulatory compliance, implementation feasibility, and environmental impacts. The facility plan should explain the criteria used and present the results of the ranking. Generally, priority for implementation should be given to projects having a payback period of three years or less.

- **Implementation and evaluation.** The implementation section of the plan should set schedules for completion of major milestones, identify roles and responsibilities, identify barriers encountered or expected, outline communications and training needs, indicate how success will be measured and evaluated, and outline priorities for future pollution prevention activities.

4. Awards and Challenge Programs

The executive orders signed in 1993 and 1994 call for large changes in the ways in which federal agencies run their operations and make day-to-day decisions. The opportunities for innovation, creative thinking, and bold leadership are enormous. Recognizing outstanding achievements provides encouragement to those who demonstrate true national leadership as well as a model for others to emulate.

The federal government is one of the nation’s largest employers; a concerted effort will be needed to develop training programs and incentives that will encourage a pollution prevention “mindset” within the federal workforce and make pollution prevention an operational tool. A federal workforce trained in and motivated by pollution prevention concepts will foster broader changes as federal employees interact with and motivate people in other sectors to develop pollution prevention approaches.

One effective means of motivating and recognizing achievement is the establishment of awards and recognition programs. Both Executive Orders 12873 and 12856 contain provisions for awards programs in pollution prevention. Executive Order 12873 establishes two awards, one to be presented annually by the White House to the most innovative program government-wide, and the other to be developed internally by each agency to reward the most innovative environmental programs.

Several challenge programs are also included in the executive orders. Executive Order 12902 directs the Department of Energy, in conjunction with other agencies, to

issue a “Federal Procurement Challenge” inviting each federal agency to commit a specified portion of their purchases to advanced, high-efficiency products.

Executive Order 12856 directs EPA to establish a Federal Government Environmental Challenge Program to recognize and reward outstanding environmental management performance in federal agencies and facilities. This program will serve as a subset of a broader Environmental Leadership program proposed by EPA in 1993. It will represent a national, voluntary effort to recognize and reward a long-term commitment to sustainable development by departments, agencies, and federal installations. At the same time, it will ensure that federal voluntary programs are credible and verifiable by establishing basic standards and public measures of success. Specifically, the program will consist of two components:

(1) Federal agencies signing onto a code of environmental principles emphasizing pollution prevention, sustainable development, and “beyond compliance” environmental management programs;

(2) Individual federal facilities submitting applications to EPA for recognition as “Model Installations.” A good compliance record will be a prerequisite to admission into the program.

The program also provides for awards to individual federal employees who demonstrate outstanding leadership in pollution prevention. EPA will be issuing preliminary guidance and criteria for this program in 1994.

5. Federal Agency Coordination

5.1 The Council on Sustainable Development

On the anniversary of the 1992 Earth Summit in Rio de Janeiro, President Clinton announced the creation of the President’s Council on Sustainable Development with the issuance of Executive Order 12852. Sustainable development has been defined as development that meets the needs of the present without compromising the future. The 25-member Council is charged with helping the President and the nation meet that challenge.

The Council will explore and develop policies that encourage economic growth, job creation, and effective use of natural and cultural resources. The Council’s goals include:

- Developing policy recommendations that integrate economic and environmental concerns, and that can be implemented by

the public and private sectors;

- Sponsoring projects that demonstrate sustainable, comprehensive approaches;
- Contributing to the work of the United Nations Commission on Sustainable Development;
- Recognizing achievements through an annual Presidential award;
- Establishing links with non-governmental organizations; and
- Educating the public about sustainable development.

Members of the Council appointed by the President include the Secretaries of Commerce, Energy, and the Interior, the Administrator of EPA, and representatives from industry, environmental, labor, and civil rights organizations.

5.2 Federal Agency Partnerships

A key element in promoting pollution prevention across the federal government is the coordination of federal agencies in pursuit of this goal. Such coordination can take the form of a broad-based Memorandum of Understanding between two or more agencies that share or overlap jurisdictions or concerns; or it can focus on one or more individual programs, policies, or regulations where agency concerns are complementary.

A successful example of coordination is the ongoing implementation of the Memorandum of Agreement signed in April 1992 by EPA and the U.S. Department of Agriculture, to implement increased pollution prevention in the agricultural sector. In addition to defining a common goal statement and four basic strategies to achieve environmental results, the partnership includes a joint grant program which awards funding to consortia of universities, research institutions, growers, and industry associations with the objective of assuring the adoption of sustainable agriculture practices and reducing the use of highly toxic herbicides and other pesticides. As a result of the Memorandum of Agreement, a Task Force was set up to devise on-the-ground pollution prevention projects in four areas: nutrients, pesticides, animal waste, and landscape management.

In another example, a three-agency effort was undertaken to meet the need for a coordinated and cohesive national response on the issue of environmental labeling and marketing claims. The Federal Trade Commission, the U.S. Office of Consumer Affairs, and EPA have been working

closely on an inter-agency task force to ensure that consumer, advertising, and environmental issues are addressed through a coordinated federal effort.

EPA is also negotiating an agreement with the General Services Administration to work together on projects relating to methods and techniques for pollution prevention, energy and resource conservation, and the efficient use of energy sources in federally owned and operated buildings. EPA intends to build on the successes of these pollution prevention agreements and will negotiate similar pollution prevention agreements with other federal agencies as appropriate.

Executive Order 12856 directed EPA to convene an Interagency Task Force by February 1, 1994 to assist in the implementation of the order. The task force will be chaired by EPA initially and will include high-level representatives from the Departments of Commerce, Defense, and Energy, the General Services Administration (GSA), and the Office of Management and Budget (OMB). Other agencies may participate as well, with the approval of the EPA Administrator.

5.3 Budget Review

Federal agency budgets are submitted to OMB in accordance with OMB's Circular A-11. Federal agencies must identify their environmental budget requirements by statute in Exhibit 46 of Circular A-11. OMB plans to update the Exhibit 46 format to reflect the requirements of Executive Order 12856 and the results of efforts to update Circular A-106.

Circular A-106 establishes a vehicle for planning, identifying, tracking, setting priorities, and reporting budget needs to EPA and OMB. The A-106 Advisory Subcommittee on Pollution Prevention has recommended a number of changes to the A-106 process to ensure that federal agency environmental projects are evaluated to positively recognize pollution prevention efforts as well as projects satisfying requirements of the executive order. Among the changes is the recommendation that high priority for funding be given to projects with payback periods of three years or less. The recommendations have been accepted by the full Committee and are being incorporated into the revised A-106 Guidance Document which is scheduled to be released in 1994.

To assist federal agencies in incorporating environmental considerations in their projects and budget requests, EPA is developing a guidance document entitled, *Costing and Life-Cycle Analysis for Pollution Prevention Investments: A Practical User's Guide to Environmental Project Financial Analysis at Federal Facilities.*

The guidance provides managers at federal facilities with an introduction to the concepts of life-cycle analysis (LCA) and total cost assessment (TCA), and outlines how to use TCA

to analyze and justify investments in pollution prevention (see Chapter 3, section 2 below for more on LCA and TCA).

5.4 EPA's Environmental Review Responsibilities

One of the most promising mechanisms and processes that federal agencies have at their disposal to help ensure adequate consideration of environmental issues in their programs and policies is implementation of the National Environmental Policy Act (NEPA) of 1970. NEPA directs federal agencies to prepare environmental statements addressing the impacts and alternatives associated with proposed "major federal actions significantly affecting the quality of the human environment."

In addition, the Act requires federal agencies to consult with and obtain the comments of other agencies, such as EPA, having statutory jurisdiction or special expertise on an action's environmental impacts. EPA's role in reviewing federal actions was expanded by Section 309 of the Clean Air Act, which specifically directs EPA to review and comment on any major federal agency action, including construction projects, proposed legislation, and proposed regulations.

As a result, both NEPA and Section 309 establish a vital opportunity for consideration of pollution prevention before important decisions are made and a framework for cooperation between EPA and other agencies of the federal government in the decision making process. In the NEPA/Section 309 area, EPA will focus its efforts initially in the following three areas:

- **Early consideration of prevention in Agency actions:** EPA will encourage federal agencies to begin consideration of pollution prevention concepts and approaches as early as possible in the planning process for major actions. EPA will seek opportunities during such early planning and assessment stages to counsel federal agencies on the pollution likely to be generated by a proposed action and on prevention opportunities.

  Prior to preparation of an environmental impact statement (EIS), the federal agency proposing an action is required to conduct a scoping process, during which the public and other governmental agencies are able to participate in discussions about the scope of issues to be addressed. EPA will include pollution prevention among the issues it raises when commenting during this scoping process.

- **Inclusion of pollution prevention in all reasonable alternatives:** EPA will also address pollution prevention in its comments on the more than 400 draft and final EIS's filed with the Agency annually. Where appropriate, EPA and other federal agencies will continue to strive for the

inclusion of pollution prevention considerations into all reasonable alternatives analyzed in EIS's.

- **Guidelines on pollution prevention for Agency reviewers:** Final guidelines issued by EPA's Office of Federal Activities ("Guidance on Incorporating EPA's Pollution Prevention Strategy into the Environmental Review Process," Feb. 24, 1993) will enable EPA's headquarters and regional reviewers to consistently integrate pollution prevention into the environmental review of federal agency actions. The guidance directs reviewers to look for pollution prevention opportunities associated with the project design specifications and standards, types of materials and resources used, and project sizing and location. Also in 1993, the Council on Environmental Quality published general guidance for federal agencies on pollution prevention, with examples of agency actions (58 *Federal Register* 6478, Jan. 29, 1993; a copy is included in Appendix G to this document).

EPA will work with federal agencies to develop the means of using NEPA to its full advantage in promoting pollution prevention in the federal government and will work on developing possible NEPA guidance to the agencies when appropriate. EPA will be offering recognition to federal agency EIS's that serve as models for incorporating pollution prevention and other environmental factors.

6. Setting an Example: EPA's Pollution Prevention Strategy

EPA continues to face a large task in integrating pollution prevention into its own regulatory and enforcement efforts. In its National Pollution Prevention Strategy issued in February 1991, EPA committed itself to this process and began to develop projects to build prevention into its existing operations. The strategy enumerated the following principles on an Agency-wide basis in order to promote pollution prevention:

- Identify and overcome barriers to pollution prevention;
- Expand public participation and choice
- Pursue partnerships with other federal agencies;
- Achieve a cultural change through outreach and training;
- Use regulations and permits to provide incentives;
- Pursue enforcement settlements to create incentives;
- Establish and implement a research strategy for prevention; and
- Identify and explore emerging technologies and products.

Some of the efforts undertaken in these areas are described below.

- **Enforcement.** EPA's Office of Enforcement has issued a

policy encouraging the inclusion of pollution prevention conditions in Agency enforcement settlements, including settlements with federal facilities. Federal facility compliance agreements with environmental auditing/pollution prevention language have been signed at eight facilities. Very often, pollution prevention represents the most cost-effective means of achieving compliance over the long term.

EPA has set a goal of including pollution prevention conditions in at least 25 percent of all enforcement actions relating to federal facilities. Other programs, including EPA's permitting and inspections programs, are also taking a close look at how prevention can be incorporated. EPA's Federal Facilities Multimedia Compliance and Enforcement Initiative is building pollution prevention into the Agency's targeting of federal facilities for multi-media enforcement inspections, including the development of individual pollution prevention profiles for all targeted facilities (see boxes on pages 22 and 23).

- **Regulatory Development.** EPA also has begun a major initiative in the regulatory arena, called the Source Reduction Review Project, to consider pollution prevention alternatives during the regulatory development process. The project will ensure that source reduction measures and multi-media issues are considered during the development of air, water, and hazardous waste standards for a key list of regulations mandated by statute under the Clean Air Act, Clean Water Act, and the Resource Conservation and Recovery Act. The project has the potential to offer more cost-effective means of complying with regulations and standards across the different environment media.

- **Education.** The role of the federal government in educating the public is extremely important in promoting pollution prevention. In line with the Environmental Education Act, EPA is working in partnership with state and local governments, industry, educational institutions, textbook publishers, teachers, and others, to strengthen environmental education. As a first step, over 2,500 curriculum items on pollution prevention have been reviewed and referenced in a bibliography. EPA's Office of Environmental Education coordinates educational activities across its own programs and other federal agencies. EPA has also established a National Center for Pollution Prevention at the University of Michigan to develop curricula for engineering, business, and other university educational tracks, and disseminate the material to other universities nationwide.

- **Grants to States and the Private Sector:** Several grant programs related to pollution prevention are in place, some as joint efforts with other agencies. They include:
- *Agriculture in Cooperation with Environment* (ACE), a joint project of EPA and USDA which awards funding to consortia of universities, research institutions, growers, and industry associations with the objective of assuring the adoption of sustainable agriculture practices and reducing the use of highly toxic herbicides and other pesticides.
- *National Industrial Competitiveness through Efficiency: Energy, Environmental and Economics* (NICE3), a joint project of EPA, DOE, and the Department of Commerce to improve energy efficiency and reduce the emissions of a targeted group of high energy-consuming and polluting industries.
- *Waste Reduction Innovative Technology Evaluations* (WRITE), a federal/state cooperative research program in which EPA works with the states to support over 35 individual technology evaluations.
- EPA's *Small Business Pollution Prevention Program* has awarded 31 grants to small businesses to support the development of innovative pollution prevention technologies.
- EPA's *Design for the Environment* program has awarded grants to six universities for projects using pollution prevention objectives in designing chemicals. EPA is working with the National Science Foundation to fund additional projects.

- **Training.** EPA has developed training materials and sponsored workshops and conferences to integrate pollution prevention concepts into existing programs. Specific pollution prevention training has been developed for Agency inspectors, permit-writers, regulation writers in the programs and Regional Offices.

The authorities and requirements of the Pollution Prevention Act have helped institutionalize prevention as EPA's strategy of first choice for addressing pollution problems emanating from industrial sources. In June 1993, EPA Administrator Carol Browner reaffirmed the Agency's commitment to making pollution prevention "the guiding principle" for all EPA programs.

U.S. Postal Service Pollution Prevention Policy

In one of the most far-reaching pollution prevention policies adopted by a federal agency, the U.S. Postal Service has issued management instructions to adopt pollution prevention practices in all postal facilities. The policy calls for:

- Encouraging the use of non-polluting technologies and

waste minimization in the development of equipment, products, and operations;

- Promoting the sustainable use of natural resources and protection of the environment through conservation, recycling, and reuse of material internally and in working with customers;

- Including environmental considerations among the criteria by which projects, products, processes, and purchases are evaluated;

- Developing in postal service employees an awareness of environmental responsibilities; and

- Maintaining an ongoing quality assurance program.

Guidelines are included for forming recycling teams at each of the Post Office's 38,000 offices, stations, and branches, and implementing a recycling program. Source reduction guidelines are under preparation and will be issued at a later date.

Federal Award Winners

Two federal programs received the EPA Administrator's Pollution Prevention Award in 1992. The Fairchild Air Force Base, located some 12 miles west of Spokane, Washington, won plaudits for its comprehensive pollution prevention planning and implementation efforts. Fairchild AFB's programs included solvent recycling at 51 shops on base; use of bead blasting technology for paint stripping; substitution of biodegradable cleaners for toxic solvents; installation of freon recapturing systems for all vehicle maintenance; and, as a first step in wetlands conservation, an inventory of all wetlands on base property.

The U.S. Navy won an award for UNICOAT, a new paint developed by the U.S. Navy Exploratory Development Program for aircraft and other industrial applications. With no toxic chromate pigments, the new paint reduces volatile organic compounds (VOCs) and hazardous waste from the painting process by 67 percent. At the same time, UNICOAT provides equivalent or superior performance to the toxic paints the Navy and Air Force have used in the past.
Pollution Prevention in the Multi-Media Enforcement/Compliance Initiative

The goal of the Federal Facilities Multi-Media Enforcement/Compliance Initiative is to improve federal

agency compliance and reduce environmental risks from federal facilities through increased use of multi-media inspections; efficient utilization of all available enforcement authorities; and enhanced use of innovative pollution prevention approaches to solving compliance problems.

Over 40 multi-media team inspections of top-priority federal facilities were completed by EPA's Regional Offices in FY93; a similar number are planned for FY94. Using an efficient, environmentally-sound approach, the initiative will provide federal agencies with a comprehensive evaluation of the environmental compliance of facilities across the nation.

As part of the initiative, pollution prevention opportunities are used as one of the criteria for targeting a facility for inspection. Pollution prevention profiles have been developed for all targeted facilities (see box, page 23). If violations are identified, this initiative promotes the maximum use of negotiated pollution prevention settlements to address compliance problems.

Profile of Pollution Prevention Opportunities at a Federal Installation

Waste Description & EPA Waste Code	EPA 33/50 Program Target (Y/N/I)	Annual Waste Quantity (Year)	Assumptions on Waste Origin or Composition of Waste	Potential Pollution Prevention Opportunities of Data
Ignitable liquid used as cold solvent (D001)	N ● Mission and BRS	Two tons (1989)	Mineral spirits used as degreasing agents in aircraft dragout from degreasing baths	● Eliminate all nonessential degreasing operations from three largest sources; ● Eliminate any unnecessary repair activities ● Reduce the number of different solvents to enhance recycling
			generates	
			opportunities	

1.25 tons

- Segregate the solvents from other waste streams and investigate both on and off site
- Determine whether spent solvents from one cleaning process can be reused in another, less rigorous cleaning process
- Determine whether solvents used in one or more degreasing processes can be replaced with hot caustic or water

Organic I 79 tons Losses from
- Install high-efficiency Mission
Solvent from (1991) from volatile
paint transfer equipment
Statement
Surface 14 separate emissions
- Eliminate all non-essential & AIRS
Coating operations
surface coating operations
Operations
- Switch to less volatile coating products
- Replace oil-based paints

FAME: Federal Agencies Mini-Exchange

A special database has been set up on EPA’s computerized Pollution Prevention Information Exchange System (PIES) to exchange information on federal agencies’ pollution prevention efforts. Information available includes policy statements, program descriptions, manuals and guidance documents, notices of conferences, seminars, and training courses, and case studies of successful pollution prevention projects. For further information on accessing PIES, call

202-260-3161. Access to a variety of other federal agency bulletin boards may be obtained through FEDWORLD (703-321-8020 or via Internet).

III. Using Purchasing Power to Prevent Pollution

The Government's Role in Acquisition

Objective: "To implement affirmative environmental acquisition programs and life-cycle costing practices throughout the federal government in order to prevent pollution, reduce waste, and create markets for environmentally preferable products and technologies."

1. Introduction

Federal purchasing power can play an important role in meeting environmental objectives. By purchasing recycled goods, for example, the federal government fosters recycling programs and ensures that stable markets exist for recycled materials. Through acquisition decisions, such as in the use of fleet fuels or energy-efficient lighting, the government can help create markets for environmentally acceptable products and technologies, and encourage the use of cleaner, less toxic products and materials in other sectors of the economy as well. Federal leadership in demonstrating and purchasing innovative technologies can spur competition, create business and employment opportunities, and enhance local and regional economies.

There are over 100,000 federal government standardized documents. The Pollution Prevention Act specifically requires EPA "to identify opportunities to use federal procurement to encourage source reduction." Executive Orders 12856 and 12873 go further, with specific requirements related to acquisitions, as discussed below.

This chapter outlines some of the tools available to federal agencies in making acquisition decisions in order to factor in environmental considerations. It then discusses the requirements to incorporate environmental factors into government specifications and standardized documents under the new executive orders. It also reviews specific targets of change in the acquisition process: ozone-depleting substances, energy-efficient products, alternative energy vehicles, and recycled goods.

2. Tools for Making Decisions

EPA is undertaking, on its own and in concert with other federal agencies, a number of projects aimed at yielding tools that will help federal agencies (and organizations outside the government) to make rational acquisition decisions based on environmental factors. Some of these programs are described below.

2.1 Life-Cycle and Costing Techniques

Federal agencies have been conducting life-cycle analyses for energy concerns for many years. That approach needs to be broadened to factor other environmental considerations into government purchasing decisions. By properly accounting for environmental costs, from product design to ultimate disposal, federal facilities will be better equipped to make appropriate acquisition decisions to purchase products and technologies that prevent pollution or minimize the generation of wastes or releases to the environment.

EPA will be issuing guidance in 1994 on financial analysis of environmental projects at federal facilities. The guidance introduces and explains several different analytic tools available. They include the following:

- **Life-cycle costing** (LCC) quantifies economic and societal costs associated with pollution prevention opportunities over an extended time horizon, and represents these costs as a single value. This permits an evaluation of the costs and benefits of different options.

- **Life-cycle analysis** (LCA) is an evolving tool for quantifying total environmental releases and impacts of a specific product (although not its costs). LCAs typically track the development of a product from raw material through production, use, and eventual disposal. They are particularly useful in evaluating the environmental trade-offs of possible modifications to product or process design.

- **Total cost assessment** (TCA) is similar to LCC in employing both economic (cost) and environmental criteria considered over an extended time period (usually five years or more). Like LCC, it evaluates direct and indirect costs, liability costs, and less tangible benefits. Unlike LCC, it focuses on internal costs and benefits to the facility rather than societal costs and benefits.

More detailed information on applying these techniques is available in several EPA publications listed in Appendix A.

2.2 Design for the Environment

A new program announced in 1992, also as part of EPA's pollution prevention strategy, is the Design for the Environment (DfE) Program which is aimed at helping business incorporate environmental considerations into the design and redesign of products, processes, and technical and management systems. Under this program, EPA is developing Cleaner Technology Substitutes Assessments to help companies compare different technologies or products, with an eye

toward selecting the most environmentally friendly alternatives. The assessments look not only at environmental impacts (releases to the environment, energy impact, comparative risk), but also at the cost and performance profiles of each alternative. In similar fashion the tools developed can be applied to solving federal facility environmental concerns. Information developed through cooperative projects with industry in the areas of dry cleaning, printing, and computer workstations, can be applied to the pollution prevention efforts of federal facilities as well. EPA will offer technical guidance to federal agencies on product design based on the results of the DfE program and on applying this analytical framework to specific design issues.

3. Acquisitions

Historically, the federal government's purchasing power has been used to encourage American manufacture of certain goods and services. These acquisition practices are supported by regulations contained in the Federal Acquisition Regulations (FAR). The Office of Management and Budget oversees regulatory revisions to the FAR and coordinates the activities of the interagency FAR Council. DOD, GSA, and NASA are represented on the FAR Council, while EPA, DOE, and other agencies are members of the Civilian Agency Acquisition Council. Most federal agencies also have their own agency-specific supplements to the FAR.

While the Department of Defense has responsibility for all military specifications and standards, the General Services Administration is responsible for developing most other federal specifications and standards. Both DOD and GSA delegate the management of some documents to other agencies. In addition, many agencies have specifications and other standardized documents related to their unique mission or activities; these are authoritative only within a particular agency. GSA's Federal Property Management Regulations require that federal specifications and standards be reviewed every five years; accuracy and use are key considerations in this review.

EPA will work cooperatively with federal procurement agencies to identify barriers to pollution prevention in acquisition/procurement standards, and will work with DOD and GSA to develop initiatives to remove barriers.

3.1 General Requirements

Under Executive Orders 12856 and 12873, the following requirements apply:

- Each federal agency must establish a plan and goals for eliminating or reducing the unnecessary acquisition of products containing extremely hazardous substances or toxic

chemicals. The plan should encompass products that the federal agency manufactures, processes, and uses. Priorities should be set for implementing the plan and goals, based on factors such as toxicity, exposure, volume, relative risk, cost and availability of substitutes, and ability of alternatives or substitutes to meet performance requirements.

- Each federal agency must also review its specifications and standardized documents and identify opportunities to eliminate or reduce acquisition of extremely hazardous substances or toxic chemicals. The review of specifications and standardized documents must be conducted by August 3, 1995, with appropriate revisions completed by 1999. Changes should be based on the availability of acceptable substitutes, risk, and performance. Federal agencies must also identify clauses in the Federal Acquisition Regulations that are roadblocks to meeting the requirements of the executive order; proposals should be submitted to the Civilian Agency Acquisition Council, which must in turn act on them by August 3, 1995.

- Where applicable, federal agencies are instructed to review and revise specifications and standardized documents to enhance the acquisition of products made from recovered materials or products that are environmentally preferable. When converting to a Commercial Item Description (CID), agencies must ensure that environmental factors have been considered and that the CID meets or exceeds the government's environmental criteria.

- Under Section 401 of Executive Order 12873, federal agencies are required to consider the following factors whenever they develop plans, drawings, work statements, specifications, or other product descriptions:
  - elimination of virgin material requirements;
  - use of recovered materials;
  - reuse of product;
  - life cycle costs;
  - recyclability;
  - use of environmentally preferable products;
  - waste prevention (including toxicity reduction or elimination); and
  - ultimate disposal, as appropriate.

- Finally, under Section 503 of Executive Order 12873, EPA will issue guidance that recommends principles that federal agencies should use in making determinations on purchasing environmentally preferable products. "Environmentally preferable" means products or services that have a lesser or

reduced effect on the natural environment or on human health when compared with competing products or services that serve the same purpose. This comparison may consider raw materials acquisition, production, manufacturing, packaging, distribution, reuse, operation, maintenance, or disposal of the product or service (see section 3.5 below).

3.2 Early Phase-Out of Ozone-Depleting Chemicals

Executive Order 12843 directs federal agencies to change their procurement policies to reduce the use of ozone-depleting substances earlier than the 1995 phase-out deadline called for in the Montreal Protocol. These policies will affect, among other things, the acquisition of refrigerants used in buildings and auto air conditioning systems.

- Under the Executive Order, federal agencies must begin immediately to minimize acquisition of the most potent (Class I) ozone-depleting substances and to maximize the use of safe alternatives. Federal agencies are directed to modify specifications and contracts that require the use of ozone-depleting substances and to substitute non-ozone-depleting substances to the extent economically practicable.

To assist in finding substitutes for ozone-depleters, EPA has developed the Significant New Alternatives Policy (SNAP) program under Section 612 of the Clean Air Act Amendments. Under the program, EPA evaluates and approves (or denies) applications for the use of substitute chemicals and technologies to replace ozone depleters in specific uses. On April 23, 1993, EPA outlined the SNAP program and proposed lists of acceptable and unacceptable substitutes for CFCs and other ozone-depleters. More information can be obtained through EPA’s Stratospheric Ozone Information Hotline listed in Appendix A.

3.3 Energy Efficient Products

Another important pollution prevention effort, highlighted by President Clinton in his Earth Day Address, is energy efficiency, which cuts across many government activities and roles. Particular progress is being made on energy efficiency related to electricity. Impetus for change comes from the requirements of the Energy Policy Act of 1992, a number of voluntary energy efficiency programs launched by EPA over the past few years, and several executive orders. Every kilowatt-hour of electricity saved prevents the emission of 1.5 pounds of carbon dioxide, 5.8 grams of sulfur dioxide, and 2.5 grams of nitrogen oxides. Other types of pollution resulting from mining and transporting

power plant fuels and disposing of power plant wastes are also reduced.

The Energy Policy Act of 1992 uses a mixture of voluntary and mandatory measures to encourage energy efficiency. The Department of Energy plays a key role in this area, developing efficiency standards and labels for products and equipment, and establishing demonstration programs for new technologies. (See Chapter 4 for a discussion of energy efficiency in federal facilities.)

Under Executive Order 12902 ("Energy Efficiency and Water Conservation") GSA is required to develop procurement techniques, methods, and contracts by September 1995 to speed the purchase and installation of energy, water, and renewable energy technologies in federal facilities. Technical assistance will be available from DOE, in coordination with EPA, GSA, and DOD, to help agencies with acquisition and new building design analyses and decisions. The Office of Management and Budget is required to issue an annual update on listings of energy-efficient products and practices; agencies are required to purchase from the listed products whenever practicable and cost-effective. In addition, agencies are directed to purchase, whenever practicable and cost-effective, products in the upper 25 percent of energy efficiency for all similar products, or products that are at least 10 percent more efficient than the minimum level that meets federal standards.

Energy efficiency in the workplace will be enhanced by Energy Star Computers, a partnership between EPA and major American computer manufacturers to market energy-efficient personal computers that automatically enter a low-power, standby state when they are inactive. Office equipment is the fastest growing electricity load in the commercial sector. Computer equipment accounts for five percent of commercial energy consumption, a figure that is expected to double by 2000. Under Executive Order 12845, signed in April 1993, the U.S. government will purchase only Energy Star computers, monitors, and printers, as long as they meet other performance requirements and are available in a competitive bid. (Contact the GSA-IRM Reference Center, 202-501-4860, for guidance publications forthcoming in Summer 1994.)

- As of October 21, 1993, federal agencies are required to specify that all computer products delivered be equipped with an active energy-saving feature to automatically enter and recover from a standby state that meets the low-power levels (defined as 30 watts or less) in the Energy Star agreement. Computers meeting the terms of the agreement are identified by the EPA Energy Star logo. Agencies should encourage the aggressive use of the standby feature by

including information on its economic and environmental benefits in routine computer training classes.

3.4 Alternative Energy Vehicles

Alternative fuel vehicles reduce air pollution, reduce U.S. demand for foreign oil, and encourage technological leadership in one of our most important industries. Alternative fuels include ethanol, methanol, propane, compressed natural gas, hydrogen, and electricity. The Energy Policy Act of 1992 sets requirements for the federal government to purchase at least 5,000 alternative fueled vehicles by FY 1993, 7,500 by FY 1994, and 10,000 by FY 1995. Executive Order 12844 commits the federal government to accelerate this schedule, exceeding these requirements by 50 percent with an additional purchase of 11,250 vehicles by FY 1995.

Thereafter, for each federal agency, the Energy Policy Act requires new acquisitions for a federal fleet to include 25 percent AFV by FY 1996, 33 percent in FY 1997, 50 percent in FY 1998, and 75 percent in FY 1999 and the years following. (A fleet is defined as 20 centrally fueled light duty vehicles located in a metropolitan area with over 250,000 people.) The acquisition program is to be structured with the objectives of: (a) continued reduction in the incremental costs associated with specific vehicle and fuel combinations; (b) long-term movement toward increasing the availability of AFVs produced as standard manufacturers' models; and (c) minimizing the life-cycle costs in the acquisition of AFVs.

Federal agencies are encouraged by Executive Order 12844 to aggressively pursue these AFV acquisition goals. Both DOE and GSA are authorized to assist agencies — by paying the incremental costs of AFVs associated with acquisition and disposal (DOE), or by providing incentives to purchase AFVs, such as priority processing of procurement requests (GSA). DOE and GSA will also carry out an education, promotion, and coordination program for federal fleets. DOE is charged with responsibilities for coordinating federal planning and siting efforts with industry, state, and local governments, to ensure that adequate private sector refueling capabilities exist wherever federal fleet AFVs are sited.

3.5 Environmentally Preferable and Recycled Products

Executive Order 12873 serves as a signal to federal agencies to buy more environmentally preferable and recycled products. Increasing the demand for these products sets off a positive chain reaction — it increases the demand for recycling programs, reduces the amount of trash which must be disposed of, and increases the use of products and

services which involve less damage to the environment.

- Under Executive Order 12873, each agency must develop and implement affirmative procurement programs related to products for which EPA sets guidelines under RCRA Section 6002. Responsibilities for implementing these procurement programs must be shared by both program personnel and procurement staff.

  EPA has published five procurement guidelines for recovered materials (covering paper and paper products, re-refined lubricating oils, retread tires, building insulation products, and cement and concrete containing fly ash) under the authority of Section 6002 of RCRA. Once EPA issues a procurement guideline designating a specific item, procuring agencies have one year to ensure that 100 percent of their purchases of products meet or exceed EPA's guideline standard subject to the following limitations: price, competition, availability, and performance. EPA is currently developing a *Comprehensive Procurement Guideline* and a related *Recovered Materials Advisory Notice* that will designate several additional items and recommend content levels of recovered materials available for those items.

- Executive Order 12873 requires EPA to institute a new, expedited process for designating items that can be made with recovered materials. It also sets higher minimum content standards for recovered materials in printing and writing paper. Under the executive order, each agency will monitor its purchases of designated EPA-guideline items and report on the status of its purchases to a Presidentially-designated Federal Environmental Executive.

- EPA has been directed by Executive Order 12873 to develop an approach for federal acquisition of environmentally preferable products that not only minimizes environmental burden, but also provides incentive to industry continuously improve the environmental performance of products and services to the federal government. The approach will guide federal agencies in comparing environmental performance among competing products and services, so that environmental impact becomes a criterion like cost or performance against which federal agencies may select products or services.

  As currently envisioned, EPA's guidance on acquisition of environmentally preferable products would include three components: (1) general principles and procedures that apply across product categories and that federal agencies can use when implementing acquisition programs for the purchase of environmentally preferable products; (2) guidance for applying these principles to specific products or product

categories (to be developed as appropriate at a later date); and (3) a code of practice for federal agencies to use when judging the credibility of non-governmental environmental certification or eco-labeling programs.

Finally, EPA will work with other federal agencies to incorporate the new federal guidelines on environmental marketing claims in advertising and labeling into their procurement and acquisition programs. The guidelines, issued by the Federal Trade Commission in July 1992 with strong support from EPA and the Office of Consumer Affairs, are intended to help reduce consumer confusion and prevent the false or misleading use of the following terms: degradable, biodegradable, and photodegradable; compostable; recyclable; recycled content; source reduction; refillable; and ozone safe and ozone friendly. The three agencies are developing a series of fact sheets that address "green marketing" issues.

IV. Managing for Prevention

The Government's Role as Generator and Facility Manager

Objective: "To significantly reduce the quantity and toxicity of pollutants released and wastes generated by federal facilities and on public lands and to make pollution prevention the approach of first choice in all environmental management decisions."

1. Introduction

All federal agencies use materials and natural resources, and generate pollutants; some also use and generate considerable quantities of toxic chemicals. The Pollution Prevention Act and the new executive orders envision fundamental changes in the way in which the government carries out its role as manager of facilities, and in its responsibilities as a generator of pollutants and waste. The goal is to reduce the quantity of all pollutants generated and to conserve use of raw materials and natural resources. Taking the lead in prevention efforts also will enhance the credibility of the government in its attempts to encourage other sectors to prevent pollution.

Even before the mandate of the Pollution Prevention Act and the 1993 executive orders, federal agencies faced clear incentives to institute pollution prevention policies and programs at installations and facilities. The Department of Defense (DOD) alone, in its 1989 Defense Environmental Status Report, reported generating 876 million pounds of concentrated solid and liquid toxic wastes (including PCBs and used oil). Other federal agencies, notably the Department of Energy (DOE), generate and release large

levels of wastes and pollutants into the air, land and water. The environmental and economic costs of these releases are enormous. Estimates for the clean-up of contaminated waste sites range from $25 billion for DOD up to $200 billion for DOE.

Progress in prevention began in the late 1980s. The Department of Defense issued a hazardous waste minimization policy in 1987 and set a goal of 50 percent reduction in the disposal of hazardous wastes by 1992. By August 1992, DOD announced that it had surpassed that goal, with a hazardous waste disposal reduction of 54 percent.

In 1990, DOE identified source reduction as the major priority of its waste minimization program. In May 1992, DOE issued a Waste Minimization Crosscut Plan to emphasize waste minimization and pollution prevention, followed shortly thereafter (August 1992) by a policy on waste minimization and pollution prevention that makes waste minimization and pollution prevention awareness, practices, and innovation the personal responsibilities of each DOE and DOE-contractor employee. In September 1992, DOE issued a directive covering its participation in EPA's Toxic Release Inventory and 33/50 program (see Exhibit 1 for details).

Some federal agencies, such as the Department of the Interior, manage or lease large amounts of land and natural resources that are owned by the federal government. The Department of the Interior has prepared a policy statement listing prevention and reduction of hazardous wastes as its first and second principles of waste management. Related activities include training and awareness, reduced mining wastes at the source, reduced pollution during oil drilling operations, better inventory management, input substitution, and cooperative efforts to set voluntary standards for pollution prevention.

EPA is prepared to assist federal agencies in training, process and methodology development, information exchange, and other services to encourage the promotion of pollution prevention activities. In addition, EPA will offer access to the Relative Risk Ranking System and guidance in applying the Cleaner Technologies Substitutes Assessment methodology of its Design for the Environment program.

Useful models for federal facilities are the "Model Community" pollution prevention demonstration projects, aimed at institutionalizing multi-media prevention-based techniques and approaches across all sectors of activity within federal installations. The first of these demonstrations has been initiated for three DOD bases (Army, Navy and Air Force) and one NASA facility in the Chesapeake Bay/Tidewater VA region (see box on next page). The demonstration projects will be designed to be readily transferable and replicable at other government

installations and communities.

The challenge for federal agencies, as for EPA itself, is to translate will into action and national policies into practices implemented at the facility level. For federal agencies to become leaders in pollution prevention, an environmental management hierarchy that emphasizes pollution prevention through source reduction must become the government's way of conducting business day-to-day at all federal facilities. Ultimately, the challenge of pollution prevention must be extended to all forms of waste, and to a reduction in the *use* of toxic materials, not just their release.

2. Toxic Chemicals:
   TRI Reporting and Reduction
   Requirements

- Under Executive Order 12856, federal facilities that manufacture, import, or process 25,000 pounds or otherwise use 10,000 pounds of listed toxic chemicals are now required to publicly report their wastes and releases under the Emergency Planning and Community Right-to-Know Act. Federal facilities will report their toxic emissions annually to EPA's Toxic Release Inventory and to the states or tribes where the chemicals are released. The public can obtain this information from a national computer database and from their respective states.

- The first of the Toxic Release Inventory (TRI) reports are due on or before July 1, 1995, covering the 1994 calendar year. Thus, facilities must begin collecting TRI data as of January 1, 1994. These requirements apply to federal facilities meeting the EPCRA definition of "facility" and exceeding the reporting thresholds. Reporting applies even if facilities do not fall within SIC codes 20-39, but it does not apply to facilities located outside the customs territory of the United States.

- Facilities meeting the TRI reporting requirements must develop goals to reduce their total releases and off-site transfers of TRI toxic chemicals by 50 percent by the end of 1999. To the extent practicable, such reductions should be achieved by source reduction practices, in preference to other strategies such as recycling or treatment. The 50 percent goal is applied on an agency-wide basis, and for all releases and off-transfers of toxic chemicals, allowing for variations in reductions achieved at individual facilities and for individual chemicals.

Although the 50 percent goal is not an absolute requirement (such as some of the EPCRA reporting requirements), it is expected that each agency will make

every effort to set and meet this target. In addition, each covered facility must prepare a written plan outlining how it will contribute to its agency-wide 50 percent target. The baseline for measuring progress in achieving the 50 percent reduction goal is the first year of public reporting of all covered facilities' TRI releases, but it cannot be later than calendar year 1994.

- Federal agencies that do not meet the reporting threshold for any TRI chemicals may still elect to set a 50 percent reduction goal for other pollutants that they generate. Some federal agencies may also choose to expand their baseline of toxic chemicals beyond the TRI list, for example, to radioactive wastes and chemicals in mixed hazardous wastes. Hazardous waste and contaminated sites that are being cleaned up under Superfund or RCRA corrective actions are not to be included in agency baselines or count as reductions toward an agency's 50 percent reduction goal.

3. Energy Efficiency

Energy consumption is a prime source of the air pollutants that contribute to acid rain, smog, and global warming. Achieving energy efficiency in federal facilities will not only make a dent in pollution, but can cut costs to agency budgets and taxpayers as well. With the new technologies available in the last decade, ample opportunities exist to substantially improve environmental quality and cut energy use, while still allowing residents and workers in federal facilities to enjoy the same, or even an improved, level of amenities.

- Under the Energy Policy Act of 1992 and Executive Order 12902, federal agencies are required to:
- Reduce overall energy use in federal buildings by 30% by the year 2005 from 1985 energy use levels.
- Increase overall energy efficiency in industrial federal facilities by 20% by 2005 using 1990 as the baseline year.
- Minimize use of petroleum products at federal facilities by switching to less-polluting alternative energy sources;
- Significantly increase the use of solar and other renewable energy sources;
- Designate one major building as a showcase for energy or water efficiency;
- Design and construct new facilities to minimize life-cycle cost through energy efficiency and water conservation technologies, and utilize passive solar design and active solar technologies wherever cost-effective.

- Each agency must undertake a prioritization survey of its facilities leading to the development of a 10-year plan

to conduct comprehensive energy and water audits at each facility. Recommendations resulting from each audit for the installation of energy efficient, water conservation, and renewable energy technologies must begin to be implemented within six months of completion of the audit.

A prominent EPA effort in energy efficiency is the Green Lights Program which was originally targeted at large companies, and has since expanded to include federal agencies, states, and numerous other organizations. The program encourages companies, government agencies, and other organizations to assess and upgrade their lighting with energy-efficient lighting technologies. Over 1000 participants are already enrolled in Green Lights, representing over 3 billion square feet of facility space — more than twice the total office space in New York, Los Angeles, and Chicago combined. Within five years, over 90 percent of this space should be upgraded, with projected reductions of carbon dioxide emissions in the hundreds of thousands of pounds.

- The Green Lights program is now available to federal facilities (see box) and several agencies have already joined. All federal agencies should commit to "Green Lights" through the new "Federal Agency Green Lights Partners Program" with the goal of upgrading lighting in their facilities, where cost-effective, by the end of 2000.

More broadly, EPA has developed an umbrella program, called Energy Star Buildings, which is aimed at encouraging organizations to save energy and reduce pollution at the lowest possible cost. EPA will provide technical information, technology demonstrations, energy analysis tools, and an HVAC upgrade manual, as well as public recognition to participating organizations (see box).

4. Solid Waste Reduction and Recycling

Executive Order 12873 provides an enormous boost to federal agency efforts to reduce waste at the source and to institute aggressive recycling programs.

- Each agency must establish a goal for solid waste prevention and a goal for recycling, to be achieved by 1995. An annual report on progress in achieving these goals is required as well. Waste prevention and recycling programs are required for any agency that has not already initiated such programs. The executive order encourages federal agencies to consider cooperative ventures with states and local governments to promote recycling and waste prevention in the community. This will not only work to conserve

disposal capacity but will also allow the federal government to serve as a model for private institutions.

- Executive agencies must also establish model facility demonstration programs that include comprehensive waste prevention and recycling, and that emphasize the acquisition of recycled and environmentally preferable products and services. The demonstration programs should use electronic data interchange in a further effort to eliminate unnecessary paper transactions.

5. Other Prevention Activities

Federal agencies should include in their strategies pollution prevention activities that address other environmental issues, such as water and other resource conservation, and hazardous waste and oil spill prevention.

- **Water Conservation.** Under Executive Order 12902, federal agencies are required to evaluate opportunities for water conservation at federal facilities and implement cost effective recommendations for water conservation technology. Executive Order 12902 embraces other incentives to encourage water conservation including:
- Incorporation of water conservation goals into management practices at federal facilities, including GOCO facilities;
- Minimization of life cycle costs in new federal facility construction through various conservation approaches including water conservation technologies;
- Designation of showcase facilities representing energy efficiency and water conservation in both new construction and existing facilities;
- Reporting to the President on efforts and actions by federal agencies to meet requirements of the order; and,
- A variety of financial, budgetary, technical assistance, incentive and awareness mechanisms designed to facilitate federal agency implementation of energy efficiency and water conservation measures.

EPA encourages federal agencies to develop programs for water conservation and water use efficiency in order to reduce overall loadings and discharges of pollutants to receiving waters. Federal agencies are encouraged to implement EPA's national Municipal Water Pollution Policy and Guidance (March 1991) at federal facilities' wastewater treatment plants. EPA has also conducted a study of Water

Use Efficiency Opportunities at federal facilities.

- **Hazardous Waste and Oil Spill Prevention.** Under Executive Order 12856, federal agencies are required to comply with the emergency planning and response provisions of EPCRA. This includes submittal of emergency planning notification (to the Local Emergency Planning Committee by March 1994); information for the preparation of Comprehensive Emergency Response Plans (by August 1994); Material Safety Data Sheets (by August 1994); an Emergency and Hazardous Chemical Inventory Form (by December 1994); and emergency notification of releases of an extremely hazardous substance (beginning in January 1994).

A Prevention Committee of the National Response Team has been established to:

(1) Provide and facilitate communication and information exchange among NRT member agencies regarding prevention activities;

(2) Maintain awareness of interagency federal hazardous material and oil spill prevention activities; and

(3) Promote the coordination of prevention activities among federal agencies, particularly those of interagency interest such as materials classification.

Tidewater Interagency Pollution Prevention Program (TIPPP) In August 1991, EPA, DOD, NASA, the Air Force, Army and Navy signed an agreement formalizing the TIPP program as a cooperative demonstration program for federal installations in the Tidewater, Virginia area. TIPPP includes the Langley Air Force Base, Norfolk Naval Base, Fort Eustis (Army), and NASA Langley Research Center. The TIPP program will develop installation-wide pollution prevention plans to reduce solid and manufacturing wastes, improve energy efficiency, test use of alternate materials, and reduce nonpoint source problems from all installation activities. Examples of achievements to date include:

- A demonstration at Fort Eustis showing how commissaries can “go green” and still maintain profitability.
- Development by NASA Langley Research Center of a new “towpreg” process to impregnate carbon fibers with dry powder resin for use in aircraft applications; the new process eliminates solvents and reduces the amount of waste generated.
- Use of a plural component paint system at Langley AFB that reduces the amount of hazardous materials entering and leaving the base.
-

Installation of aqueous parts washers (to reduce solvent use in the parts cleaning process) at one of Naval Base Norfolk's maintenance facilities and aboard the U.S.S. Theodore Roosevelt.

Green Lighting for Federal Agencies

The Green Lights program for federal agencies is similar to the one currently in place for corporations. "Federal Partners" agree to conduct lighting surveys on their facilities, to upgrade the lighting to energy-efficient technologies wherever cost effective, to document their efficiency improvements, and to help enhance public awareness of energy efficient lighting. EPA offers technical information on lighting products and technologies, computer software to calculate financial data, and a network of trained surveyors to help implement optimal upgrades. For more information, contact the Green Lights Hotline at 202-775-6650.

Federal relighting efforts will also benefit from the base of information developed as part of the Department of Energy's Federal Relighting Initiative. The Defense Logistics Agency has also issued a catalog of new lighting products for use by government agencies in designing energy-efficient lighting systems.

For assistance with lighting fixtures and bulbs, call DLA at 1-800-DLA-BULB.

Energy Star Buildings

Opportunities for energy-savings exist throughout most buildings, through a combination of technology upgrades and improved building operations and maintenance. Maximum energy and cost savings are the goal for each type of building.

For information on Energy Star Buildings, contact Chris O'Brien at EPA, 202-233-9146.

Example 1: Low-rise commercial building in cold climate.
Typical package of upgrade options:

- Improved roofing insulation
- Green Lights
- High-efficiency furnace or heat pump
- High-efficiency packaged air conditioning

Example 2: Office buildings in hot climate.
Typical package of upgrade options:

- Window films
- Green Lights
- Variable speed motor drives for fans and pumps
- High-efficiency chiller with economizer.

V. Demonstrating Federal Leadership

The Government's Role in Pollution Prevention R&D and Tech Transfer

Objective: "To develop technical solutions and to foster technology transfer among federal agencies and between the public and private sectors to address pollution prevention needs and to enhance United States competitiveness in markets for goods and services that are environmentally friendly."

1. Introduction

In order for the federal government to promote pollution prevention, it needs to promote and build a strong scientific and technical foundation through sound R&D. Coordination and collaboration among federal agencies are vital to address the technological and socioeconomic challenges involved in preventing pollution. Executive Order 12856 encourages federal agencies to develop and test innovative pollution prevention technologies at their facilities in order to facilitate the development of strong markets for such technologies. Toward that end, Executive Order 12856 encourages the formation of partnerships among industry, federal agencies, government laboratories, academia, and others "to assess and deploy innovative environmental technologies for domestic use and for markets abroad."

The goal of the government's pollution prevention R&D efforts is to develop, evaluate and promote opportunities, options and approaches that are needed by the public and private sector to achieve pollution prevention. This section outlines some of the pollution prevention activities currently being undertaken by EPA and other federal agencies in five areas of R&D and technology transfer: methods development; technology development and evaluation; assessments and demonstrations; technical assistance and technology transfer; and commercialization.

A number of federal agencies already have pollution prevention research, development, demonstration and technology transfer programs in place. They include: the Departments of Agriculture, Commerce, Defense, Energy, Interior, Transportation, the National Aeronautics and Space Administration, the General Services Administration, and the National Science Foundation. To enhance the opportunities to prevent pollution through joint efforts, EPA has developed memoranda of understanding (MOUs) with other federal agencies that include R&D activities. For example, R&D and technology transfer are critical components to the MOU signed by EPA and DOE in October 1992 to enhance general cooperation between the agencies.

In developing their pollution prevention strategies,

federal agencies should be cognizant of the large number of ongoing projects and build on these projects rather than duplicating them. Current projects can serve as a framework for cooperative efforts and for developing new applications of pollution prevention methods and technologies. In addition, federal agencies should be aware of the assistance available from EPA in developing their pollution prevention R&D and technology transfer activities:

- EPA will perform R&D and work with other federal agencies to establish the technological and socioeconomic foundations for pollution prevention.

- EPA will conduct R&D and work with other federal agencies to identify, develop and evaluate techniques for preventing pollution. EPA will provide technical support to ensure that federal policies and regulatory decisions incorporate pollution prevention concepts.

- EPA will assist other federal agencies to assess and ensure that federal facility processes and practices incorporate pollution prevention. Through a variety of programs (described below), EPA will also try to assist federal agencies in applying pollution prevention R&D results to operations and facilities management.

- EPA will work cooperatively with other federal agencies to facilitate the transfer of pollution prevention information from the public sector to the private sector, and vice versa using the Pollution Prevention Information Clearinghouse (PPIC) and other vehicles.

- As EPA develops its own Technology Innovation Strategy, it will broaden its interest in innovative technologies beyond those which are directly and obviously concerned with the environment, to a wider array of technology design decisions that can have an important impact on the environment.

Numerous technical assessments of pollution prevention opportunities and options have been developed by EPA's ORD Pollution Prevention Research Branch in recent years. They are available through the Center for Environmental Research Information and are listed in Appendix A.

2. Current R&D and Tech Transfer Programs

2.1 Methods Development

EPA's research program for pollution prevention includes the development, assessment, and application of tools to

track progress in pollution prevention by directly or indirectly measuring pollutant reductions, environmental and health effects, and economic and social benefits. Tools being developed involve assessment techniques, modelling techniques and life-cycle assessments. EPA is also using modeling to develop a set of pollution prevention factors for various pollution prevention techniques for incorporation into commercial process simulation programs. Research programs will also be implemented to measure the results of pollution prevention programs. These will look at pollutant reduction, energy and materials use reduction, environmental and health effects, and economic and social effects.

EPA, DOD, and DOE jointly manage a coordinating mechanism — the *Strategic Environmental Research and Development Program* (SERDP) — which has as one of its primary objectives conducting "joint research, development and demonstration projects relating to innovative technologies, management practices, and other approaches for preventing pollution from all sources." EPA has begun working with DOD and DOE to identify specific research and demonstration projects for SERDP. One example is a proposed Integrated Energy/Environment Decision Methodology for Federal Installations, which would design, develop, test, and demonstrate a reliable integrated energy/environment decision methodology. The methodology could be used by DOD (and other federal) installations to guide the modernization process.

2.2 Technology Development and Evaluation

A number of federal agencies are performing research in pollution prevention to develop and evaluate new materials, practices and technologies. For example, to help reduce stratospheric ozone depletion, EPA's Air and Energy Engineering Research Laboratory has been working with the Coast Guard under an interagency agreement to investigate the applicability of North Slope halon replacements for marine vessel uses. This program was originally established to investigate halon replacements for North Slope explosion prevention and fire suppression. Preparations for field-scale testing of the leading replacement candidates are underway.

EPA (ORD) has also been working with the U.S. Department of Agriculture to develop and evaluate new technologies to reduce nonpoint source pollution. For example, EPA's Environmental Research Laboratory is planning to evaluate the use of variable rate chemical application technologies. The application of pesticides would be based on crop needs.

2.3 Assessments and Demonstrations

Federal facilities provide an opportunity to demonstrate advanced environmental technologies and innovative process operations in the pollution prevention arena. EPA's Office of Research and Development has been working with a number of federal facilities to develop pollution prevention programs, as well as pollution prevention opportunity assessments, audits, and demonstrations.

One primary program for promotion of pollution prevention research is a cooperative effort between EPA and the federal community called *Waste Reduction Evaluations at Federal Sites* (WREAFS). The three primary objectives of the program are to: (1) conduct pollution prevention opportunity assessments and case studies; (2) conduct research and demonstration projects jointly with other federal activities; and (3) provide technology and information transfer of pollution prevention results via project reports, project summaries, conference presentations, and workshops. Projects are underway with the Departments of Agriculture, Defense, Energy, Interior, Transportation, Treasury, and Veteran Affairs. (See box, page 41, for a sample assessment.)

In another program to assist industry, EPA and DOE are sponsoring the performance of pollution prevention assessments and energy audits at qualifying small to medium-sized manufacturers. Six university centers will perform 60 combined "industrial assessments" in FY 1994. Plans call for expanding the number of trained university centers to 40 by FY 1996.

EPA and the Department of Commerce have recently agreed on a five-year program to provide pollution prevention technical assistance to small and medium-sized businesses in the metal forming, metal finishing, and metal plating industries. As part of the program, EPA will help fund technical assistance in pollution prevention to be offered to small manufacturers by the Great Lakes Manufacturing Technology Center in Cleveland (part of the Commerce Department's National Institute of Standards and Technology).

A wide range of pollution prevention technical demonstrations are underway or being planned elsewhere in the federal sector. For example, the Air Force Air Logistics Center at Tinker Air Force Base has been working with EPA to assess and evaluate pollution prevention opportunities at the base involving CFCs, electroplating wastes, component cleaning, painting/paint-stripping, and vapor degreasing. At Wright Patterson Air Force Base, EPA has assisted the Air Force in the modification of a vapor degreaser that has reduced emissions by about 80 percent. Some federal

laboratories are considering becoming “test centers” to assess and evaluate pollution prevention techniques and technologies through demonstrations.

2.4 Technology Assistance

Another component integral to the federal government’s policy and research role in pollution prevention is that of technical assistance and technology transfer. The federal government has the opportunity to be a leader in this area through its technical assistance offices, its R&D facilities and staff, and its ability to conduct pilot programs that can be replicated and transferred to other public and private sector situations. Examples of activities related to technology transfer in pollution prevention include workshops, and advisory groups.

- **Workshops:** EPA sponsors a number of workshops to provide technology transfer on pollution prevention R&D and technology developments. For example, ORD’s Center for Environmental Research Information (CERI) provides “train-the-trainer” workshops that will help states, universities and other participants to improve their pollution prevention assessment skills and deliver training programs for small and medium-sized businesses. Workshops to date have involved pollution prevention training in electroplating rinsing processes, metal painting processes, and cleaning and degreasing processes.

- **Advisory Groups:** Recognizing that innovations in pollution prevention will emerge primarily from the generators of pollution, EPA along with the University of Cincinnati, established the *American Institute for Pollution Prevention* (AIPP) in order to create a new liaison channel with industry. The Institute is composed of representatives of some 25 trade associations and professional societies. DOD and DOE are also active members of AIPP. Among the projects undertaken by Institute members is the development of a series of pollution prevention-oriented homework problems for use in engineering curricula.

Another important group affecting pollution prevention R&D is the *National Advisory Council on Environmental Policy and Technology (NACEPT)*. This council comprises a group of experts serving in an advisory capacity directly to the EPA Administrator, studying ways to foster technology innovation in pollution prevention and other areas. The Departments of Defense and Energy are both also represented on NACEPT.

2.5 Commercialization

The federal government is sponsoring and actively pursuing activities and programs to accelerate the flow of

environmental technologies to the national and international marketplace. EPA, DOE and DOD laboratories have a number of programs underway to foster cooperative work between the federal government and industry to enhance environmental and energy technology development.

- **Cooperative Research and Development Agreements (CRADAs):** Most federal agencies are authorized to enter into these agreements with private firms and other appropriate parties. CRADAs typically pair government research laboratories and private research facilities in joint efforts to develop and marketing new technologies.

- **National Technology Initiative (NTI):** The National Technology Initiative encourages federal laboratories to work in collaboration with industry to restore and protect the environment, and to foster effective competitive markets for U.S. goods and services. One technical area that has been identified under NTI for collaborative research involves pollution prevention. As part of NTI, DOE and EPA have sponsored a series of workshops to identify opportunities for cooperative agreements and programs between the federal government and industry.

- **National Environmental Technologies Applications Corporation (NETAC):** NETAC is a non-profit corporation established under a cooperative agreement between the University of Pittsburgh and EPA to link the resources and experience of industry, government, and academia to assist in the commercialization of technologies. NETAC provides guidance to companies on how to deal with regulatory, financial, marketing and technical issues. NETAC's toll-free Technology Development Hotline, 800-48-NETAC, is available Monday through Friday, 9 a.m. to 5 p.m. Funded by EPA, the hotline offers information about: the environmental technology commercialization process; public and private financing sources; and government programs supporting technology development and commercialization.

- **National Defense Environmental Corporation (NDEC) and the National Defense Center for Environmental Excellence (NDCEE):** NDEC is a non-profit subsidiary of the University of Pittsburgh Trust which operates NDCEE for the Department of Defense. NDEC works with government and industry to identify and develop solutions to environmental problems due to manufacturing, and operates a small factory to demonstrate alternative pollution prevention technologies. NDCEE, which can be reached at 815-269-2523, focuses on the impact of manufacturing process engineering.

Additional resources, clearinghouses, hotlines, and publications are listed in Appendix A.

Case Study: WREAFS Program
Waste Minimization Opportunity Assessment: Fort Riley, Kansas

A pollution prevention opportunity assessment under the WREAFS program at the U.S. Army Forces Command maintenance facilities at Fort Riley, Kansas, identified several waste reduction opportunities. The study focused on a multi-purpose building (Building 8100) used for automotive subassembly rebuilding, lead acid battery repair as well as a number of other Army maintenance operations.

Waste Battery Acid: The assessment proposed that waste acid be gathered in a holding tank, filtered, and adjusted in concentration, as needed for reuse in reconditioned or new batteries. The buildup of dissolved metal impurities in this recycling system would be prevented by purging part of the acid from the system. The purged acid would be neutralized to allow on-site disposal as nonhazardous waste. Recycling of the reformulated battery acid would require a capital investment of $15,200 but would save $36,000/year in operating costs. This would yield a payback of 0.42 years.

Automotive Parts Washer Wastewater: The assessment proposed installing external equipment to handle the dirty aqueous alkaline detergent solution resulting from automotive parts cleaning. The proposed process would include emulsion breaking, removal of oils and grease by skimming, filtration, and addition of fresh alkaline detergent as necessary, followed by recirculation of the cleaned washwater to the automotive parts cleaner. This option is expected to save $107,100/year in operating costs, leading to a payback period of 0.18 years.

In light of the short payback periods of the two waste reduction options identified, successful implementation of these options at Fort Riley would create the potential for application of similar waste minimization options in at least 10 other U.S. Army FORSCOM installations.

Project summaries for this and other case studies are available from U.S. EPA/RREL, Pollution Prevention Research Branch (MS-466), 26 W. Martin Luther King Drive, Cincinnati, OH 45268.

VI. Conclusion

“We in the federal government must lead the way in reducing the use of environmentally harmful materials. Pollution prevention makes economic sense. We’ll save money on raw materials, we’ll have less waste to dispose of, and we’ll protect American citizens and our own environment.”
— Carol M. Browner, EPA Administrator

The government’s pollution prevention role in acquisitions, facility management, policy-making and technology depends on the motivation and commitment of managers in each federal agency to initiate and implement successful pollution prevention programs. Federal agencies make thousands of decisions each year at every level in the course of carrying out their mandates — from drafting regulations to running hospitals, from funding educational programs to acquiring parts and supplies. Each of these activities presents opportunities to prevent prevention.

In the private sector, pollution prevention efforts have been found to be most successful when they are part of the corporate philosophy, that is, when they are instituted as a company-wide goal at the highest levels of management. In the federal sector, endorsement of pollution prevention has indeed been formalized at the highest level of leadership, with the President of the United States. That leadership and its accompanying vision for federal agencies are embodied in the executive orders signed in 1993. As a contributor to pollution and waste generation, the federal government has a responsibility to become a leader in finding solutions. The new executive orders provide both the means and the motivation for the federal government take that step.

Through its many programs, policies, and acquisition decisions, federal agencies are in a strategic position to make pollution prevention the dominant approach to solving environmental issues in our society. Working cooperatively with departments and agencies, EPA hopes to advance pollution prevention at all levels of the government, signaling a new era in federal responsibility and innovation in environmental protection.

Appendix A: Resources

General Information

- EPA’s **Pollution Prevention Information Clearinghouse** (PPIC) supports pollution prevention through technology transfer, education, and public awareness. PPIC’s electronic bulletin board, the Pollution Prevention Information Exchange System (PIES) offers free technical, policy, programmatic, legislative, and financial information on source reduction and recycling efforts in the United States and internationally. The PPIC reference and referral service (tel: 202-260-1023; fax: 202-260-0178) can direct callers to

appropriate sources of information and provide selected EPA documents and fact sheets free of charge. A special database on federal facilities pollution prevention efforts, the Federal Agencies Mini-Exchange (FAME), has been established on PIES; for information on accessing it, call 202-260-3161.

- **Pollution Prevention Training Opportunities Guide,** available through PPIC, is an annual directory of training-related services and materials. It contains information on publicly sponsored training opportunities and resources on pollution prevention.

- The **Solid Waste Information Clearinghouse** (SWICH) is funded by EPA and operated by the Solid Waste Association of North America. SWICH covers a range of solid waste issues, including source reduction, recycling, composting, collection and transfer. Call 800-67-SWICH (677-9424).

EPA Hotlines

Green Lights Hotline 202-775-6650
Stratospheric Ozone Info Hotline
800-296-1996
Office of Water Resource Center
202-260-2814
Stormwater Hotline 703-821-4823
RCRA Hotline 800-424-9346
EPCRA Hotline (TRI information)
800-535-0202
TSCA Hotline (33/50 information)
202-554-1404

EPA Publications

- **Pollution Prevention and Right-to-Know in the Government: Executive Order 12856** (EPA 100-K-93-001, October 1993). Summarizes provisions and includes a copy of the executive order. Available from EPCRA hotline or PPIC.

- **Interpretive Guidance for Implementation of Executive Order 12856** (March 1994). Detailed guidance on each section of the executive order. Available from EPCRA hotline or PPIC.

The following documents are available from:
Center for Environmental Research Information
26 West Martin Luther King Drive
Cincinnati, Ohio 45268
Phone: (513) 569-7562
Fax: (513) 569-7566

Life-Cycle Analysis

- **Life-Cycle Assessment: Inventory Guidelines and Principles** (EPA/600/R-92/036, November 1992, 108 pp.). First in a series of document on life-cycle assessment (LCA) methods, this document sets out general guideline and principles for conducting the inventory phase of an LCA — the quantification of all inputs and outputs of a process, product, or service.

- **Life-Cycle Design Guidance Manual: Environmental Requirements and the Product System** (EPA 600/R-92/226, January 1993, 181 pp.). Life-cycle design is a proactive approach for integrating pollution prevention and resource conservation strategies into the development of more ecologically and economically sustainable product systems.

- **Costing and Life-Cycle Analysis for Pollution Prevention Investments: A Practical User's Guide to Environmental Project Financial Analysis at Federal Facilities** (under development). Applies life-cycle principles to key decisions relevant to federal facility management and procurement processes.

Facility Assessments

- **Facility Pollution Prevention Guide** (EPA/600/R-92/088, Revised 1992, 143 pp.) Manual for identifying hazardous waste pollution prevention opportunities. Includes worksheets, sample assessments, causes and sources of waste, pollution prevention techniques, and discussions of economic evaluation methods. Provides details on how to set up pollution prevention programs. This guide updates the "Waste Minimization Opportunity Assessment Manual" (EPA, ORD, July 1988) which describes procedures for implementing a waste minimization program.

- **Business Guide to Reducing Waste** (EPA/530/K-92/004, Sept. 1993). A manual to assist organizations in conducting facility waste assessments and establishing a solid waste reduction program. (Available through RCRA Hotline.)

- **Compliance Through Pollution Prevention: Federal Facility Pollution Prevention Guide** (forthcoming). Applies the Facility Pollution Prevention Guide to opportunities and situations most relevant to federal facilities.

- **Pollution Prevention Case Studies Compendium** (EPA 600/R-92/046, April 1992, 98 pp.). Short descriptions of pollution prevention demonstrations, including company description, wastes reduced, technologies used, and cost and savings information.

- **Generic Protocol for Environmental Audits at Federal Facilities,** U.S. EPA. Revised to incorporate the identification of pollution prevention opportunities across all media as an integral part of the audit process.

- **Total Cost Assessment: Accelerating Industrial Pollution Prevention through Innovative Project Financial Analysis,** with applications to the pulp and paper industries (EPA/741/R-92/002, June 1992, 167 pp.). This manual describes the concepts and methods of comprehensive, long-term financial analysis of pollution prevention projects.

- **A Primer for Financial Analysis of Pollution Prevention Projects** (EPA/600/R-93/059, April 1993, 32 pp.). Basic analytical techniques to analyze and justify pollution prevention investments, focusing on economic and financial factors.

- **Toxic Release Inventory Report for Federal Government-Owned, Contractor-Operated (GOCO) Facilities under Section 313 of the Emergency Planning and Community Right-to-Know Act,** U.S. EPA Office of Federal Facilities Enforcement and Office of Pollution Prevention, August 1993. TRI release data, including individual facility totals, agency totals, and chemical/release information.

- **Guides to Pollution Prevention.** A series of industry-specific volumes that present options for minimizing waste generation through source reduction and recycling.
  - Automotive Refinishing Industry EPA/625/7-91/016
  - Auto Repair Industry EPA/625/7-91/013
  - Commercial Printing Industry EPA/625/7-90/008
  - Fabricated Metal Industry EPA/625/7-90/006
  - Fiberglass Reinforced & Composite Plastics EPA/625/7-91/014
  - Marine Maintenance and Repair EPA/625/7-91/015
  - Mechanical Equipment Repair Industry EPA/625/R-92/008
  - Metal Casting & Heat Treating Industry EPA/625/R-92/009
  - Non-Agricultural Pesticide Users EPA 625-R-93-009
  - Paint Manufacturing Industry EPA/625/7-90/005
  - Pesticide Formulating Industry EPA/625/7-90/004
  - Pharmaceutical Preparations EPA/625/7-91/017
  - Photoprocessing Industry EPA/625/7-91/012
  - Printed Circuit Board Manufacturing Industry

EPA/625/7-90/007
Research and Educational Institutions
EPA/625/7-90/010
Selected Hospital Waste Streams EPA/625/7-90/009

- **Waste Minimization Opportunity Assessment Project Summaries.** Results of cooperative assessments performed by EPA and federal agencies at federal facilities.

Fort Riley, Kansas EPA/600/S2-90/031
Philadelphia Naval Shipyard EPA/600/S2-90/046
U.S. Coast Guard Support Center, Governors Island, NY
EPA/600/S2-90/062
Naval Undersea Warfare Engineering Station, Keyport, WA
EPA/600/S2-91/030
Optical Fabrication Laboratory, Fitzsimmons Army Medical Center, Denver, CO EPA/600/S2-91/031
A Truck Assembly Plant EPA/600/S2-91/038
A Photofinishing Facility EPA/600/S2-91/039
Scott Air Force Base EPA/600/S2-91/054

- **Project Summaries:**

Hospital P2 Case Study EPA/600/S2-91/019
Evaluation of Five Waste Minimization Technologies/General Dynamics Pomona Division Plant EPA/600/S2-91/067
Automotive and Heavy-Duty Engine Coolant Recycling by Filtration EPA/600/S2-91/066
Automotive and Heavy-Duty Engine Coolant Recycling by Distillation EPA/600/S2-91/024

- **Environmental Research Briefs**. Short summaries of the results of selected waste minimization assessments.

Waste Minimization Assessment for:
Manufacturer of Printed Plastic Bags
EPA/600/M-90/017
Metal Parts Coating Plant EPA/600/M-91/015
Manufacturer of Outdoor Illuminated Signs
EPA/600/M-91/016
Manufacturer of Rebuilt Railway Cars and Components
EPA/600/M-91/017
Manufacturer of Brazed Aluminum Oil Coolers
EPA/600/M-91/018
Manufacturer of Heating, Ventilating, and Air Conditioning Equipment EPA/600/M-91/019
Bumper Refinishing Plant EPA/600/M-91/020
Multilayered Printed Circuit Board Manufacturing
EPA/600/M-91/021
Manufacturer of Printed Circuit Boards
EPA/600/M-91/022
Paint Manufacturing Plant EPA/600/M-91/023

Manufacturer of Compressed Air Equipment Components
EPA/600/M-91/024
Manufacturer of Aluminum Cans EPA/600/M-91/025
Manufacturer of Refurbished Railcar Bearing Assemblies
EPA/600/M-91/044
Manufacturer of Prototype Printed Circuit Boards
EPA/600/M-91/045
Manufacturer of Speed Reduction Equipment
EPA/600/M-91/046
Manufacturer of Printed Circuits EPA/600/M-91/047
Manufacturer of Chemicals EPA/600/S-92/004
A Dairy EPA/600/S-92/005
Manufacturer of Metal-Cutting Wheels and Components
EPA/600/S-92/006
Manufacturer of Automotive Air Conditioning Condensers and Evaporators EPA/600/S-92/007
Printed Circuit Board Manufacturer
EPA/600/S-92/008
Manufacturer of Components for Automobile Air Conditioners
EPA/600/S-92/009
Manufacturer of Aluminum Extrusions
EPA/600/S-92/010
Manufacturer Producing Galvanized Steel Parts
EPA/600/S-92/011
Manufacturer of Commercial Ice Machines and Ice Storage Bins EPA/600/S-92/012
Manufacturer of Water Analysis Instrumentation
EPA/600/S-92/013
Manufacturer of Can-Manufacturing Equipment
EPA/600/S-92/014
Manufacturer of Metal Bands, Clamps, Retainers, and Tooling EPA/600/S-92/015
Manufacturer of Permanent-Magnet DC Electric Motors
EPA/600/S-92/016
Manufacturer of Military Furniture
EPA/600/S-92/017
Aluminum Extrusions Manufacturer EPA/600/S-92/018
Manufacturer of Metal-Plated Display Racks
EPA/600/S-92/019
Manufacturer of Motor Vehicle Exterior Mirrors
EPA/600/S-92/020
Manufacturer of Sheet Metal Cabinets and Precision Metal Parts EPA/600/S-92/021
Manufacturer Producing Treated Wood Products
EPA/600/S-92/022
Manufacturer of Industrial Coatings
EPA/600/S-92/028
Manufacturer of Cutting and Welding Equipment
EPA/600/S-92/029
Manufacturer of Finished Metal Components

EPA/600/S-92/030
Manufacturer of Machine Tools EPA/600/S-92/031
Manufacturer of Injection-Molded Car and Truck Mirrors
EPA/600/S-92/032
Manufacturer Producing Printed Circuit Boards
EPA/600/S-92/033
Manufacturer of Custom Molded Plastic Products
EPA/600/S-92/034
Manufacturer of Sheet Metal Components
EPA/600/S-92/035
Manufacturer of Silicon-Controlled Rectifiers and Schottky Rectifiers EPA/600/S-92/036
Manufacturer of Penny Blanks and Zinc Products
EPA/600/S-92/037

Waste Reduction Activities and Options for:
Printer of Forms and Supplies for the Legal Profession
EPA/600/S-92/003
Nuclear Powered Electrical Generating Station
EPA/600/S-92/025
State DOT Maintenance Facility EPA/600/S-92/026
Local Board of Education in New Jersey
EPA/600/S-92/027
Manufacturer of Finished Leather EPA/600/S-92/039
Manufacturer of Paints Primarily for Metal Finishing
EPA/600/S-92/040
Manufacturer of Writing Instruments
EPA/600/S-92/041
Manufacturer of Room Air Conditioning Units and Humidifiers EPA/600/S-92/042
Autobody Repair Facility EPA/600/S-92/043
Fabricator and Finisher of Steel Computer Cabinet
EPA/600/S-92/044
Manufacturer of Artists’ Supply Paints
EPA/600/S-92/045
Manufacturer of Wire Stock Used for Production of Metal Items EPA/600/S-92/046
Manufacturer of Commercial Refrigeration Units
EPA/600/S-92/047
Transporter of Bulk Plastic Pellets
EPA/600/S-92/048
Manufacturer of Electroplated Wire
EPA/600/S-92/049
Manufacturer of Systems to Produce Semiconductors
EPA/600/S-92/050
Remanufacturer of Automobile Radiators
EPA/600/S-92/051
Manufacturer of Fire Retardant Plastic Pellets and Hot Melt Adhesives EPA/600/S-92/052
Printing Plate Preparation Section of a Newspaper

EPA/600/S-92/053
Manufacturer of General Purpose Paints and Painting Supplies EPA/600/S-92/054
Manufacturer of Fine Chemicals Using Batch Processes
EPA/600/S-92/055
Laminator of Paper and Cardboard Packages
EPA/600/S-92/056
Manufacturer of Hardened Steel Gears
EPA/600/S-92/057
Scrap Metal Recovery Facility EPA/600/S-92/058
Manufacturer of Electroplating Chemical Products
EPA/600/S-92/059
Manufacturer of Plastic Containers by Injection Molding
EPA/600/S-92/060
Fossil Fuel-Fired Electrical Generating Station
EPA/600/S-92/061
Manufacturer of Commercial Dry Cleaning Equipment
EPA/600/S-92/062
Electrical Utility Transmission System Monitoring and Maintenance Facility EPA/600/S-92/063
Manufacturer of Orthopedic Implants
EPA/600/S-92/064